PROMAX

FIELD STRENGTH METERS & SPECTRUM ANALYZERS

BROADCAST, CABLE, SATELLITE, IPTV, OPTICAL AND WIFI

RANGER *Neo*

4K ULTRAHD

EASY OPERATION

Hybrid user interface (touch + keyboard)

HEVC H.265

High Efficiency Video Codec

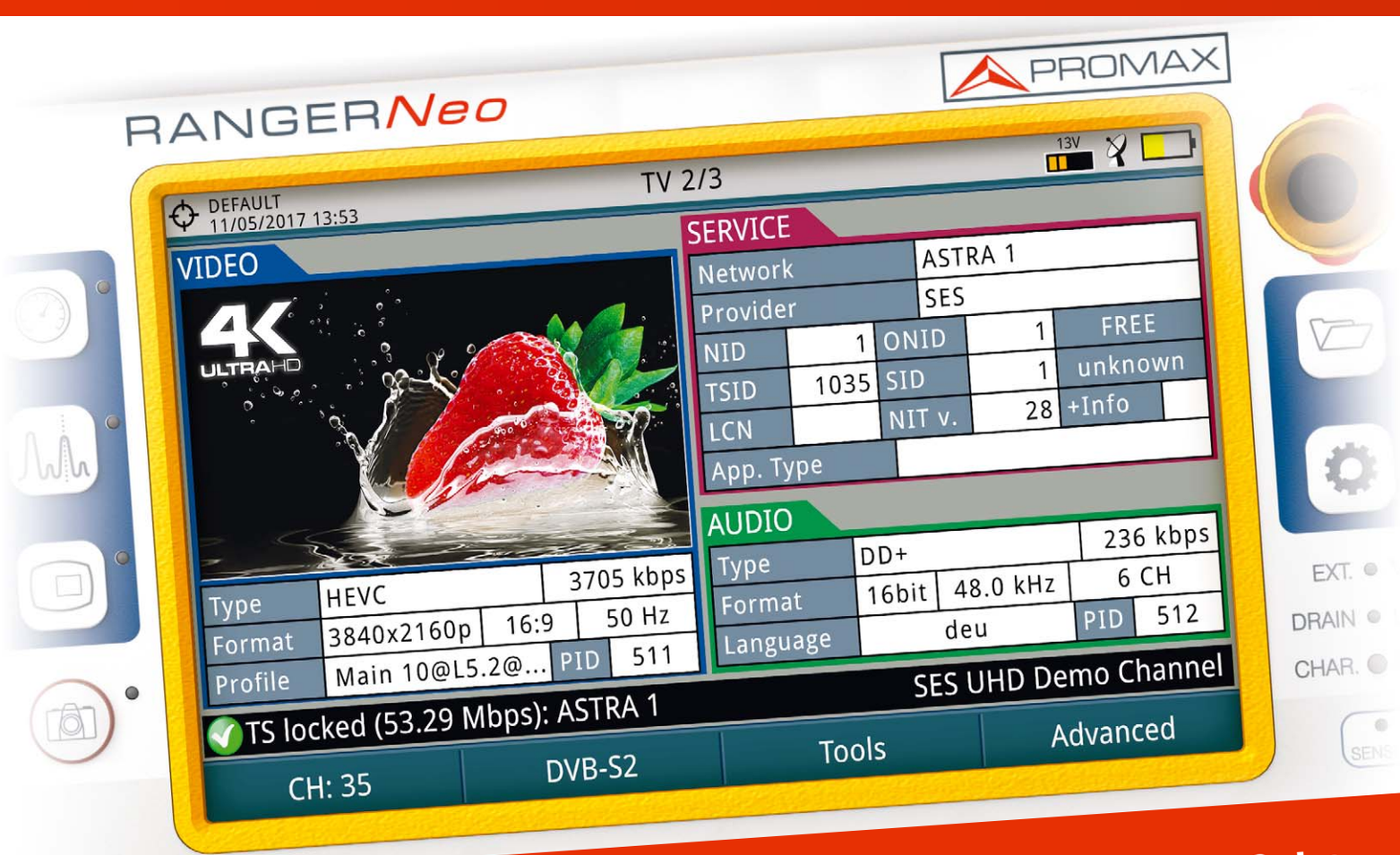
WIFI ANALYZER

Dual display: SPECTRUM and DATA

WIDEBAND LNB

Extended SAT band on a single SPAN

PROMAX



HEVC H.265 decoding

High efficiency Video Codec

RANGER*Neo* covers from 5 to 2500 Mhz and includes HEVC decoding. On top of that, the **RANGER*Neo* 4** features a 4K decoder displaying UHD services. The rest of **RANGER*Neo*** models feature the “4K frame grabber” tool which decodes UHD video frames and displays them in a slideshow mode.

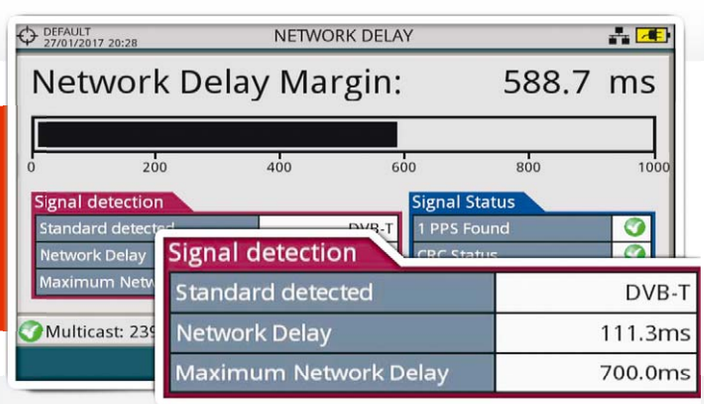
- **ULTRA FAST SPECTRUM**
- **TRIPLE SPLIT DISPLAY**
- **LIGHT WEIGHT (< 3 kg)**
- **SMART BATTERY CONTROL**

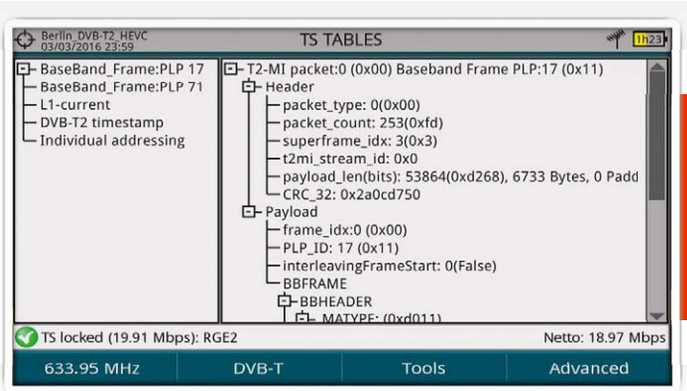
CHECK COMPARISON TABLE

For broadcasters

Network delay margin

Network planners determine what time instant transmitters should use to broadcast the transport stream bits. They all have to do it at a precise given time, e.g. 700 ms in the picture. The difference between the network delay and the required transmission time (700 ms in the example) is called the “network delay margin” and it will be different depending on the specific transmitter location. The lower the 'network delay margin' the higher the chances of that particular transmitter missing the assigned transmission time.



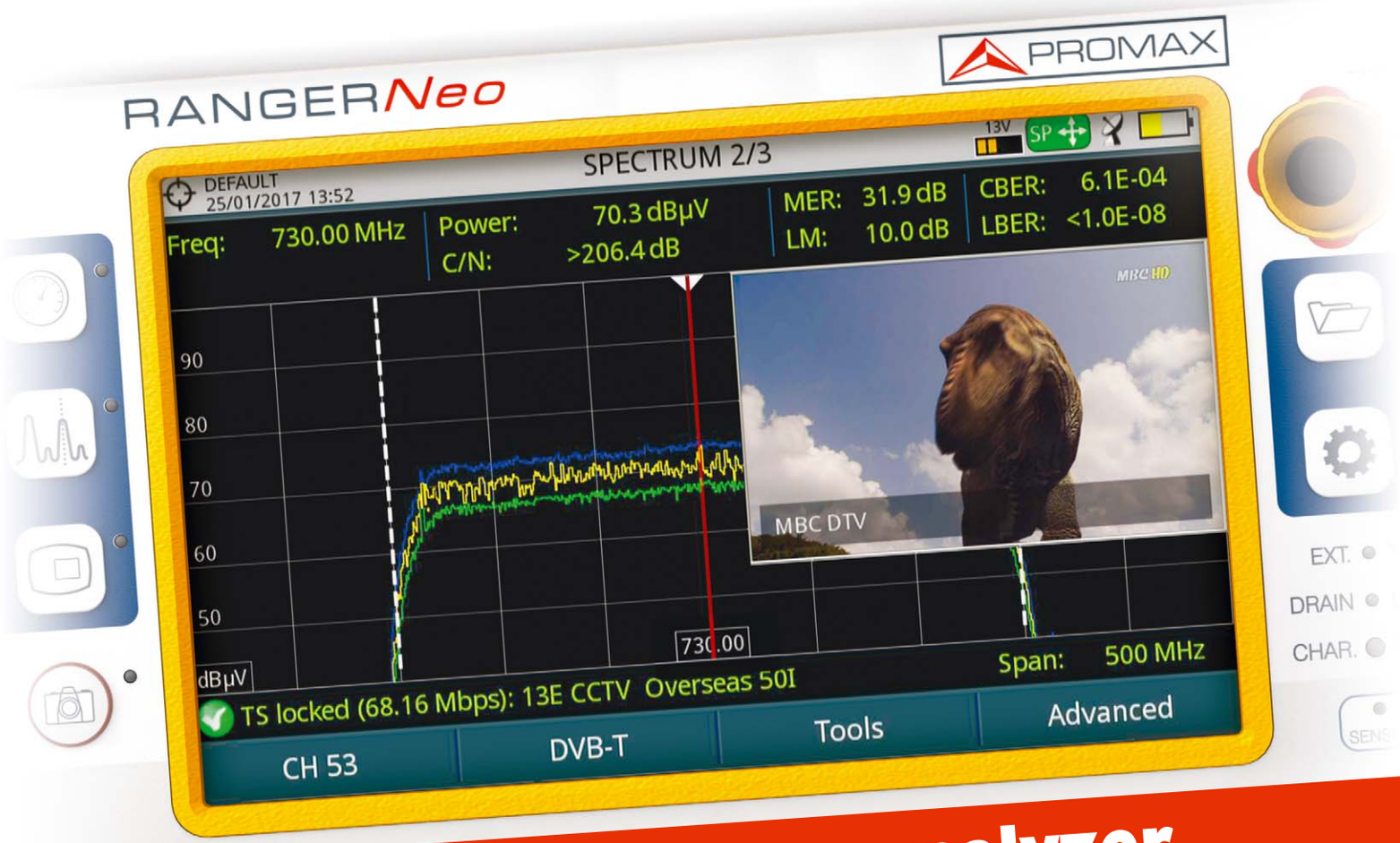


Receiving and analyzing T2-MI signals

T2-MI is the modulator interface signal used in the 2nd generation digital terrestrial television broadcasting system. It is physically transported to the TV towers using IP or RF and it is accessible via network devices in the form of ASI or IP signals.

RANGER*Neo* can receive a T2-MI signal in both these formats, performing IP transport quality measurements, T2-MI packet analysis and PLP de-encapsulation.

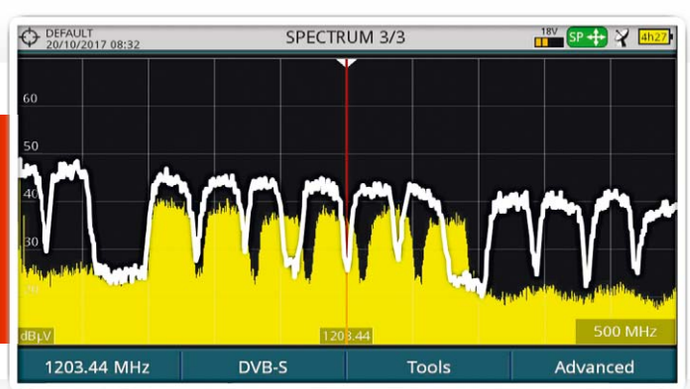
CHECK COMPARISON TABLE

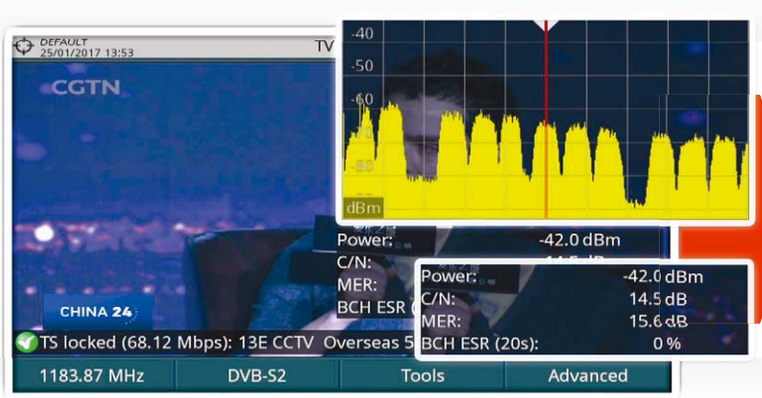


Professional spectrum analyzer

Reference traces

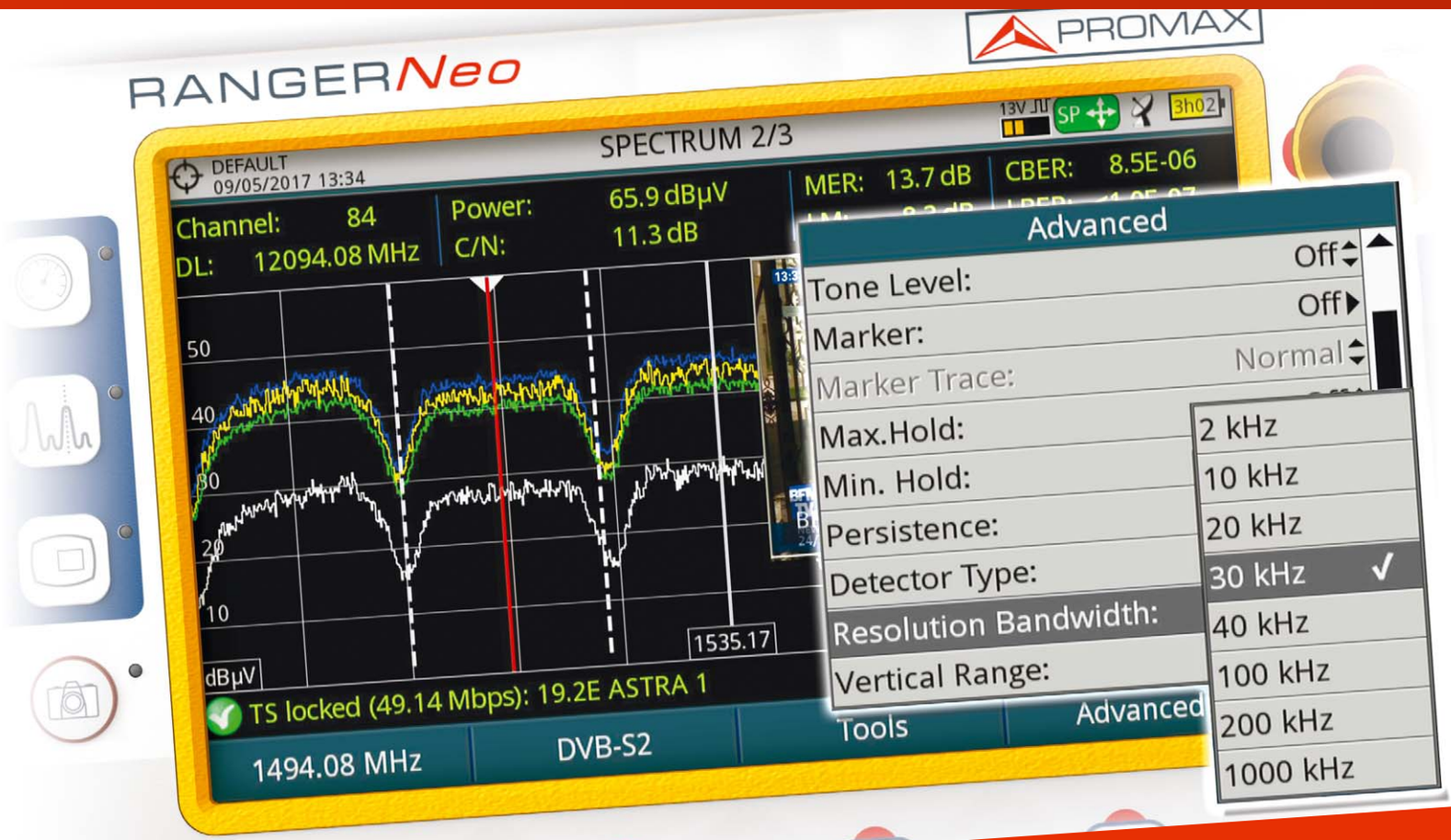
Freeze the spectrum graph and compare it with the running trace. Save that information and use it to identify satellites based on their spectrum footprint.





Triple split display

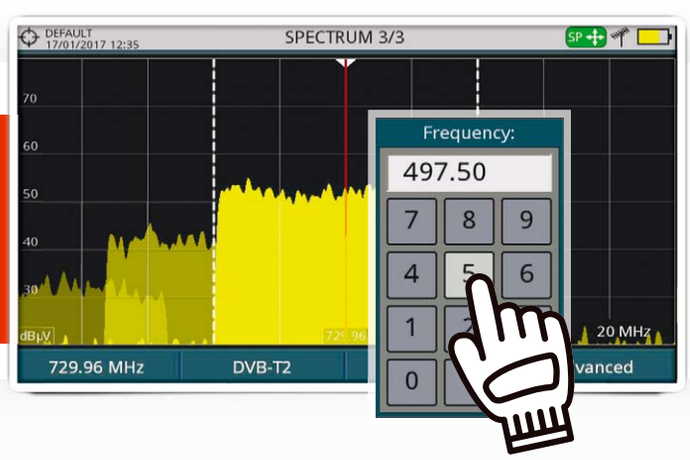
Up to 9 different ways to combine TV, measurement and spectrum modes.

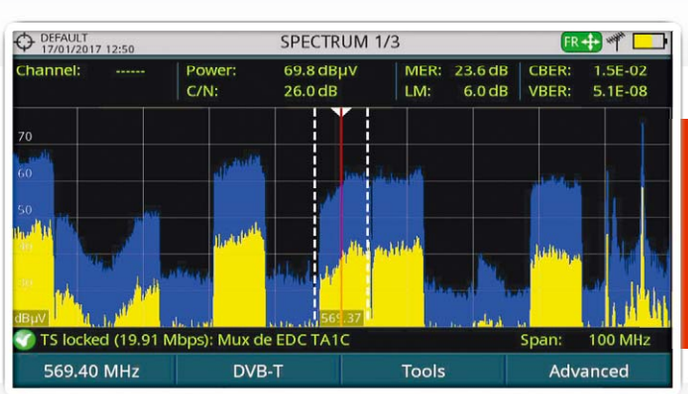


High resolution filters ★

Touch screen

Place the marker on any channel and move the trace using your finger. Enter frequencies or file names using the soft keypad.

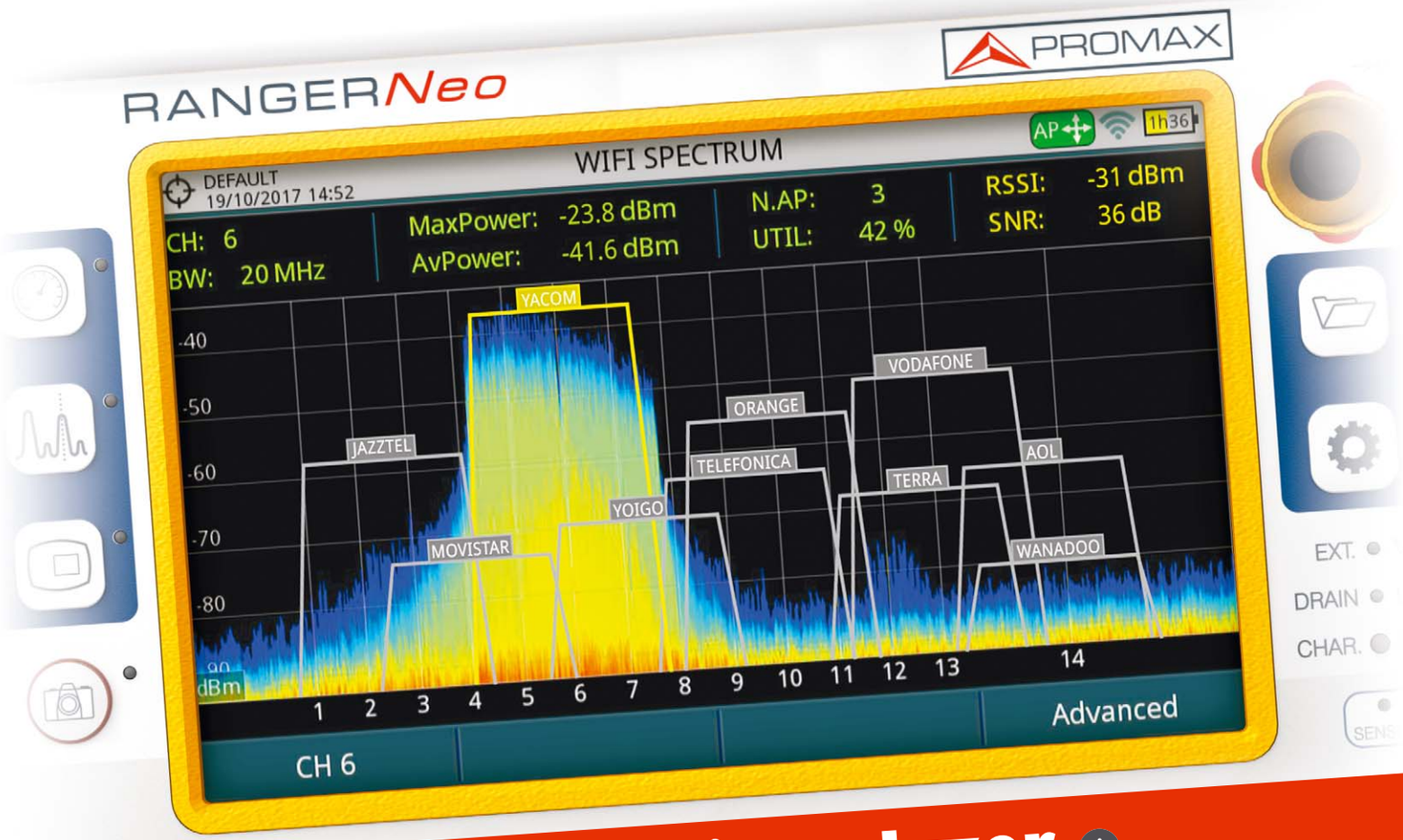




MIN and MAX hold

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

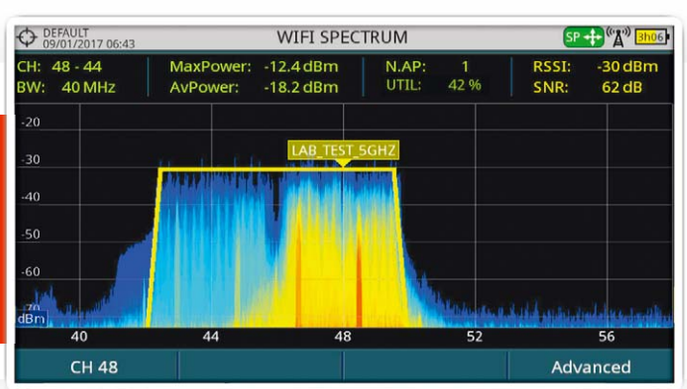
★ CHECK COMPARISON TABLE

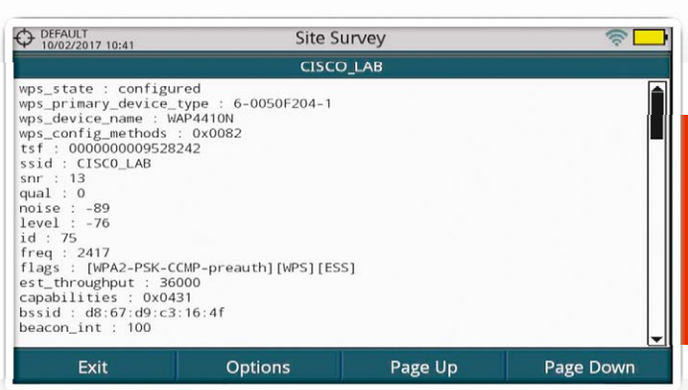


2.4 & 5.7 GHz WiFi analyzer ★

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*** can display real spectrum analyzer information and access point data simultaneously.





Access point information

RANGER*Neo* 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


PROMAX
RANGERNeo
WIFI SPECTRUM
MaxPower: -24.0 dBm
AvPower: -56.9 dBm
N.AP: 1
RSSI: -31 dBm
SNR: 36 dB
CH: 8
BW: 20 MHz
CH 8
F1
F2
F3
F4
Wi Fi
free
training

Wi Fi™

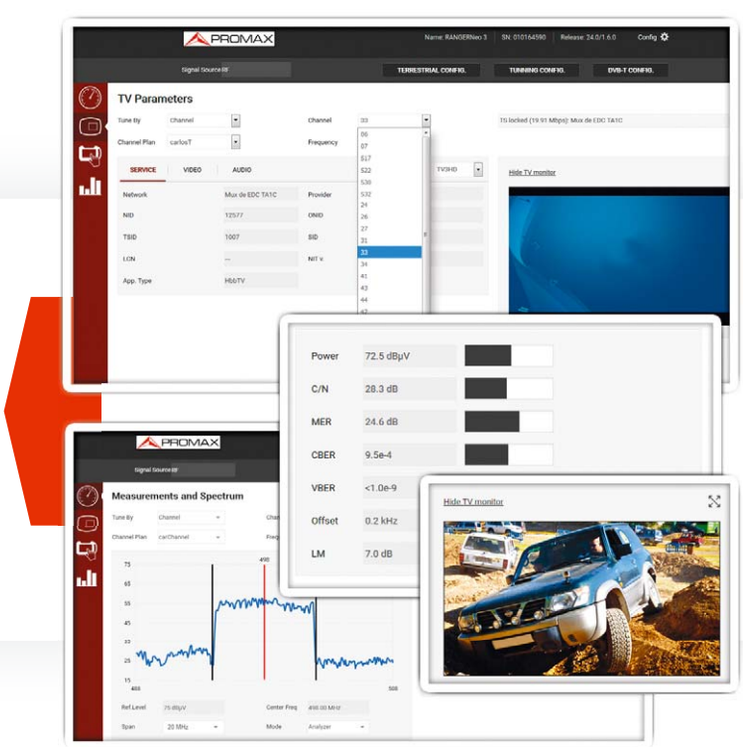
Webserver and Video streaming ★

Web server

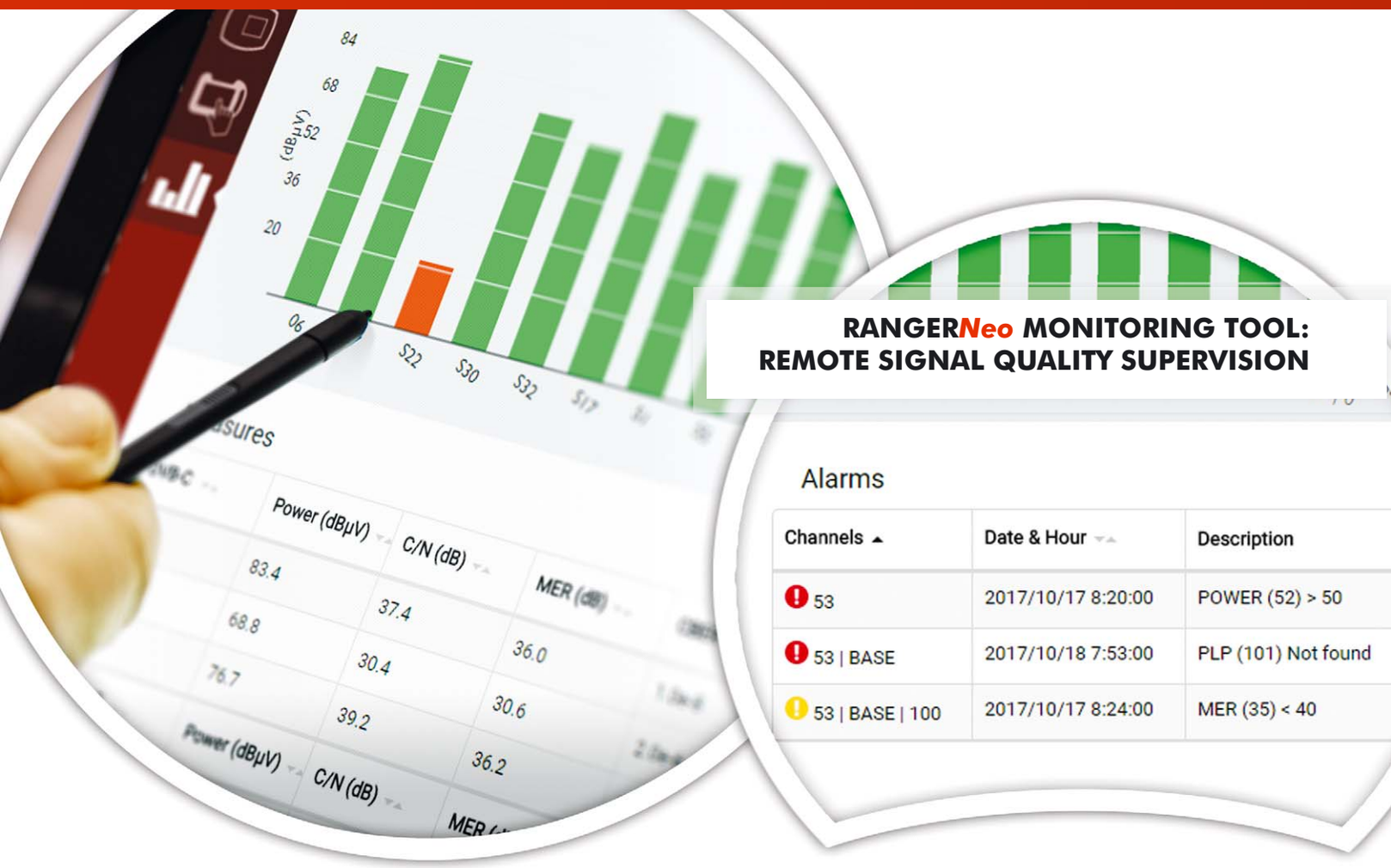
The **RANGER*Neo*** internal webserver offers four main areas: Spectrum analyzer, TV Parameters, Remote console and Monitoring mode.

The Spectrum analyzer area shows us the spectrum trace, and all measurements for the RF channel being tuned, while we can modify reference level, span, channel/frequency and channel plan used.

The TV parameter area offers relevant metadata identifying the network (NID), (ONID), TS, Service, LCN, etc. plus a continuous streaming of one of the services belonging to the channel selected.

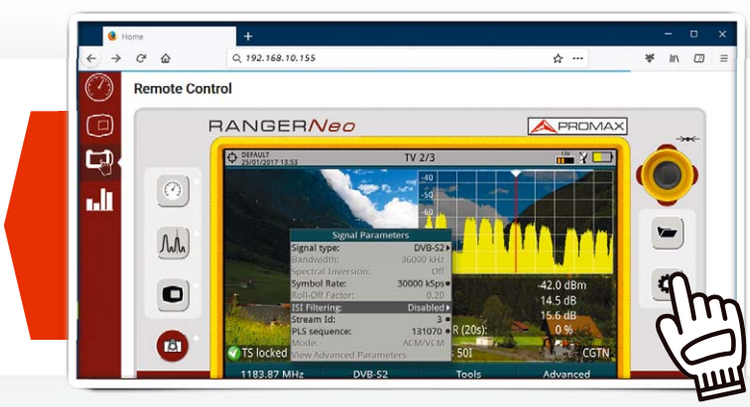


★ CHECK COMPARISON TABLE



RANGER*Neo* Console

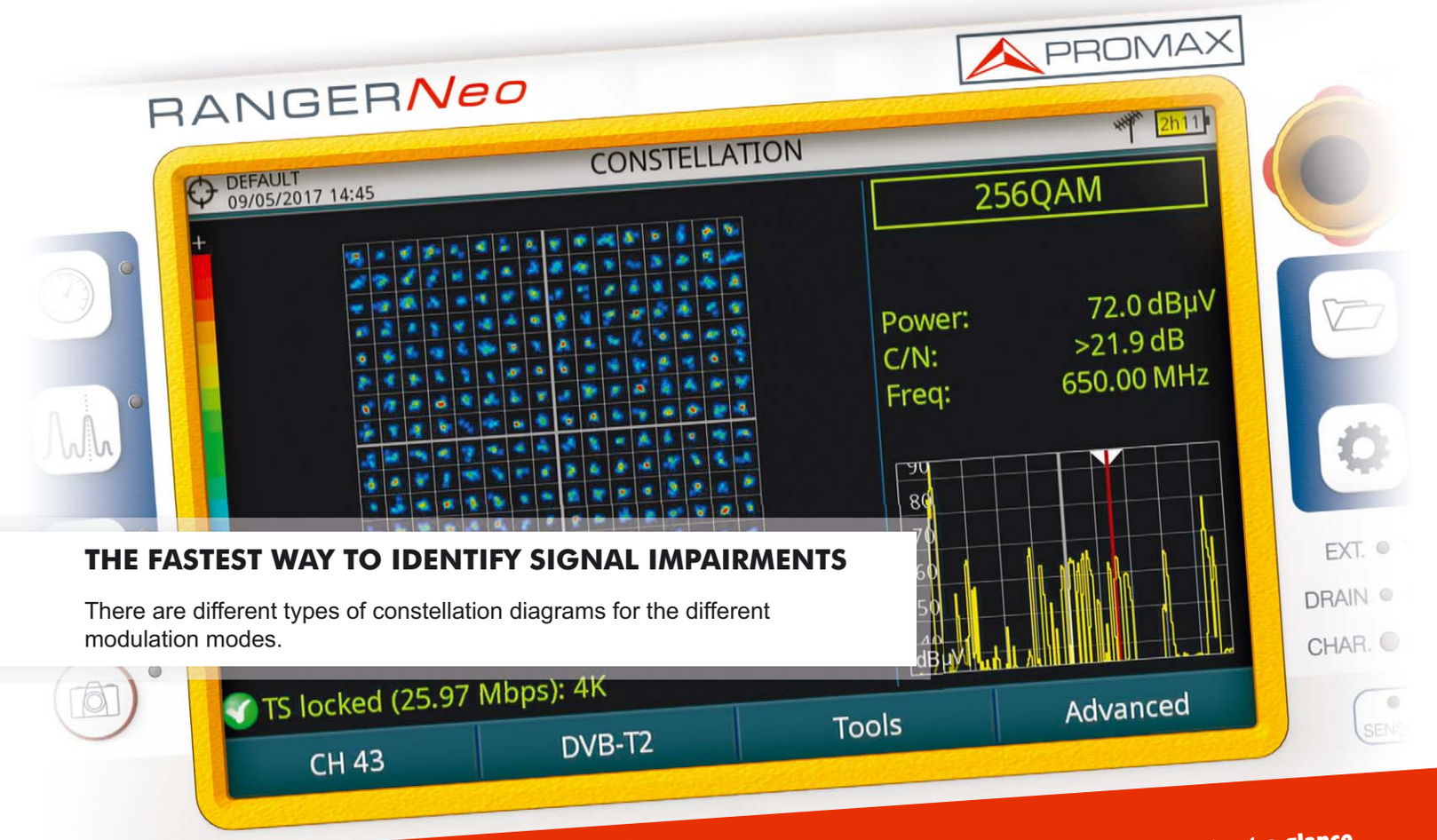
Complete control over your field strength meter from anywhere in the world and with no additional software installation required. A virtual platform that gives you access to all of the analyzer features.



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.



THE FASTEST WAY TO IDENTIFY SIGNAL IMPAIRMENTS

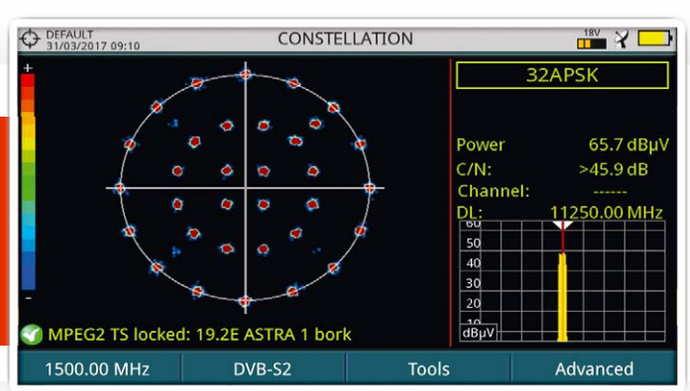
There are different types of constellation diagrams for the different modulation modes.

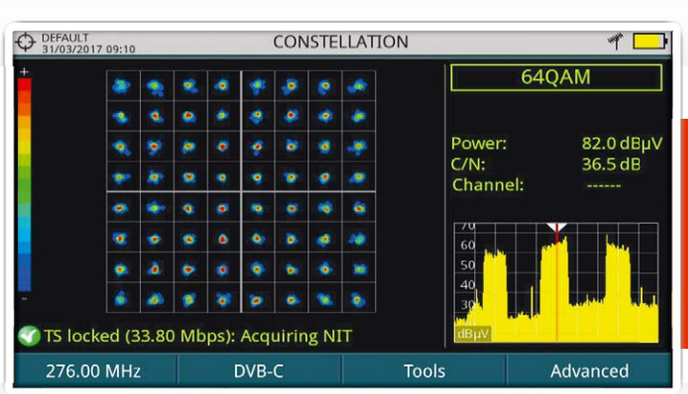
Constellation diagram

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.



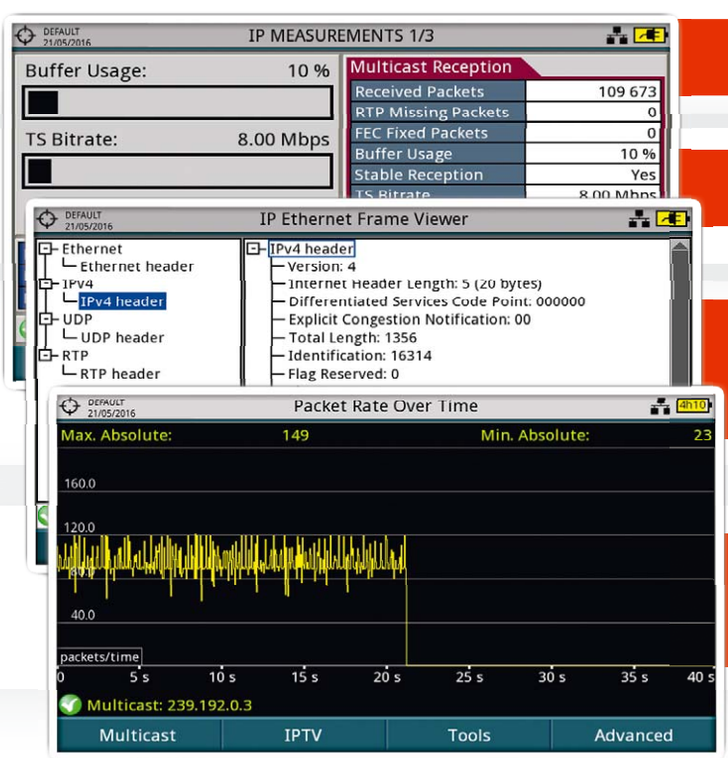


16, 32, 64, 128, 256 QAM

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.

CHECK COMPARISON TABLE

IPTV functions ★



Network bitrate

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

Media Delivery Index

A key quality measurement formed by the Delay Factor and the Media Loss Rate.

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

WIDEBAND LNB COMPATIBLE

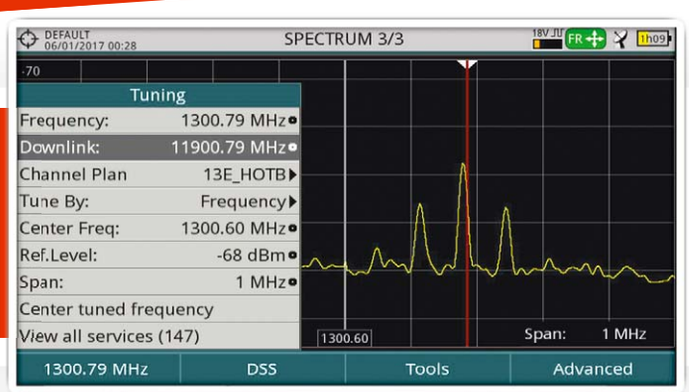
Wideband LNBs deliver the entire vertical and horizontal satellite polarities (low and high band together) using two separate RF cables and an extended IF frequency range from 290 to 2,340 MHz. **Is your analyzer ready?**

Advanced satellite technology

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*** includes a very narrow 2 kHz filter available in terrestrial TV band.

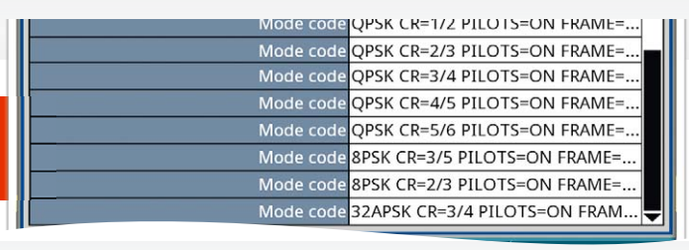


IRG descriptor identification

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.

VCM / ACM modulation schemes

VCM / ACM (Variable/Adaptative Coding and Modulation) allow changing the modulation parameters used in the same RF channel over time.

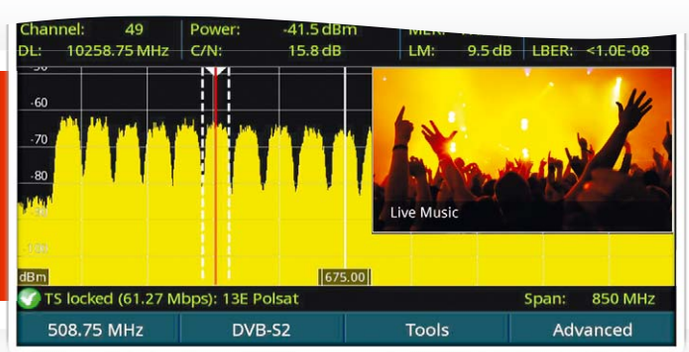


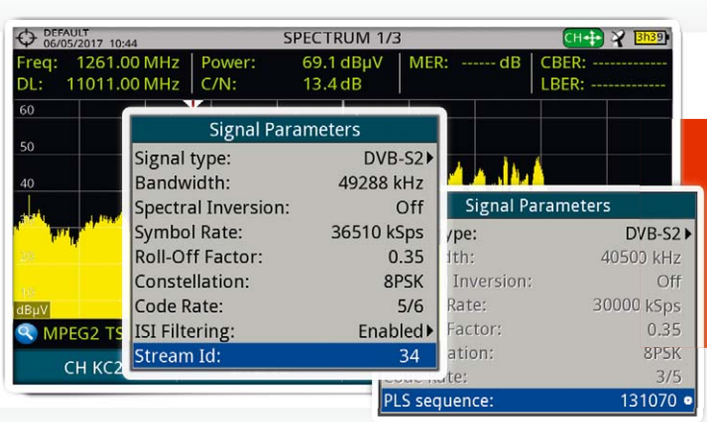
CHECK COMPARISON TABLE

Multistream, PLS and dCSS

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 communicates using EN50494 (SATCR, UNICABLE) and EN50607 (dCSS, JESS, UNICABLE II) standard protocols.



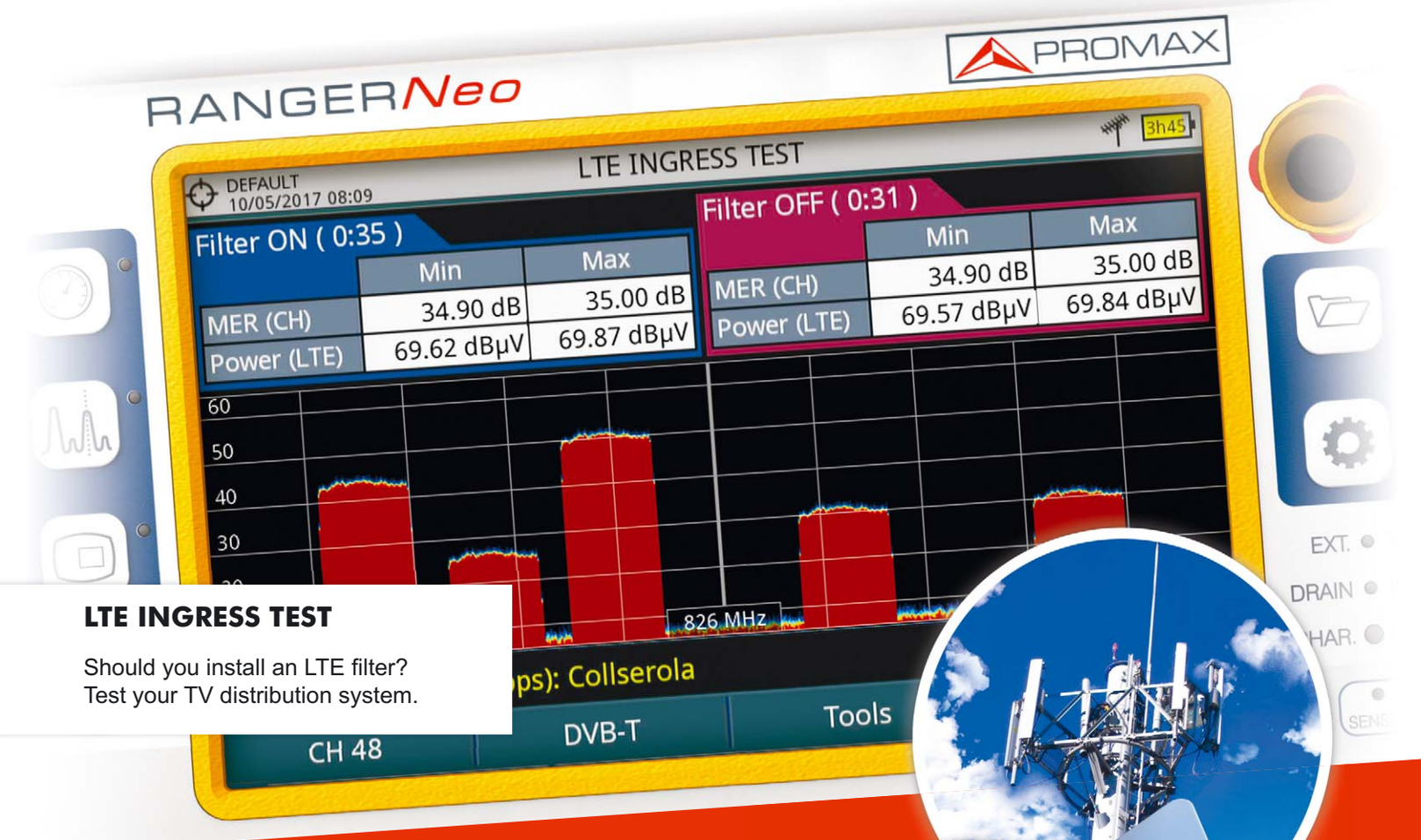


PLS - Physical Layer Scrambling

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*** can also work with this type of signals.

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*** using the ISI Filtering function.



LTE INGRESS TEST

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

LTE interference

LTE interference on SMATV systems

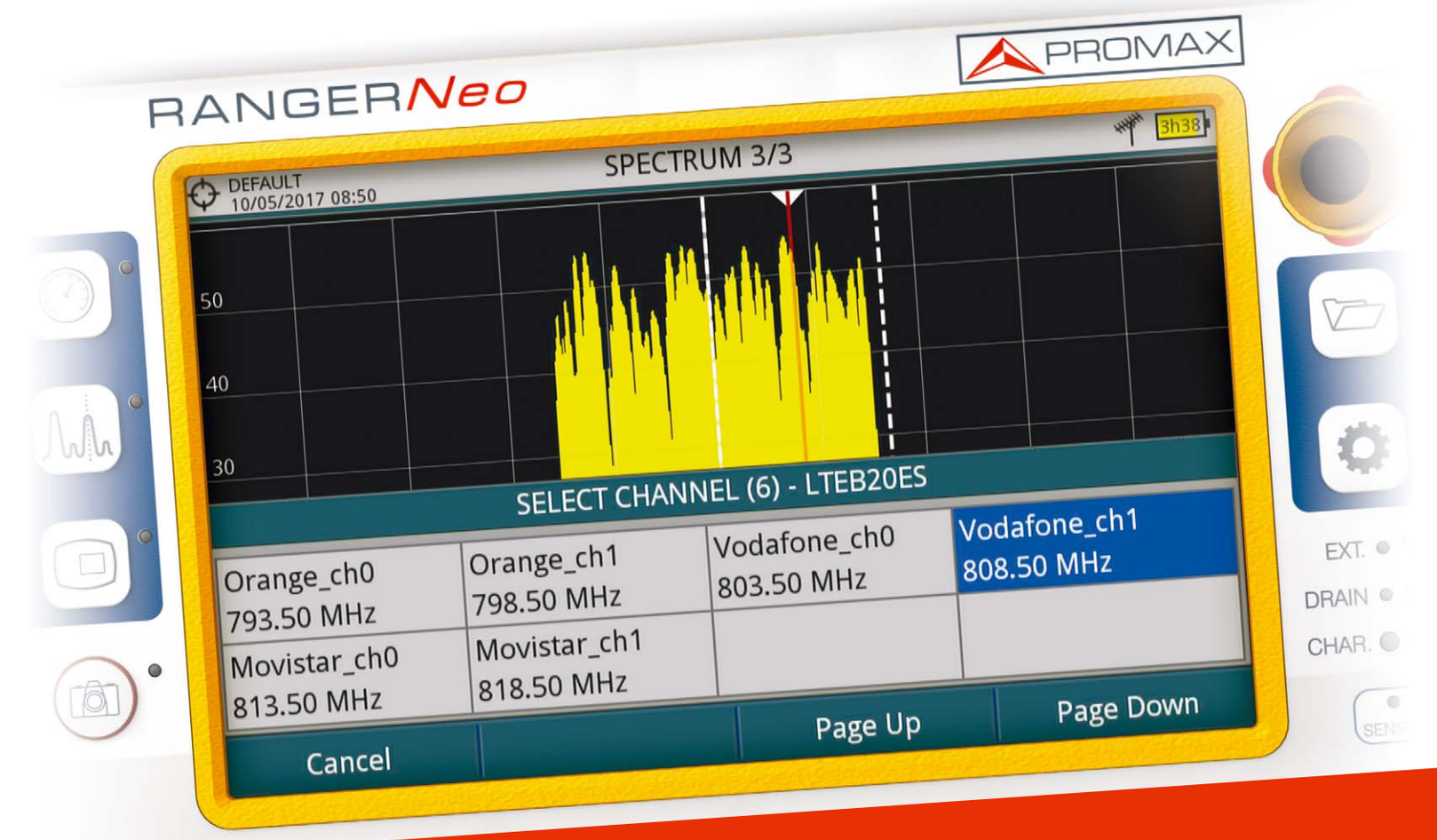
The **RANGER*Neo*** has a variery of tools to compare the signal reception quality measurements on digital TV channels with and without the LTE filter. This is very helpful to anticipate the performance improvement you should expect on your TV distribution system well before you physically make changes 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 20 (uplink 832-862 MHz; downlink 791-821 MHz). The **RANGER*Neo*** has special functions to help installers determine the level of activity in those bands and therefore anticipate potential interference problems

Downlink and Uplink interference

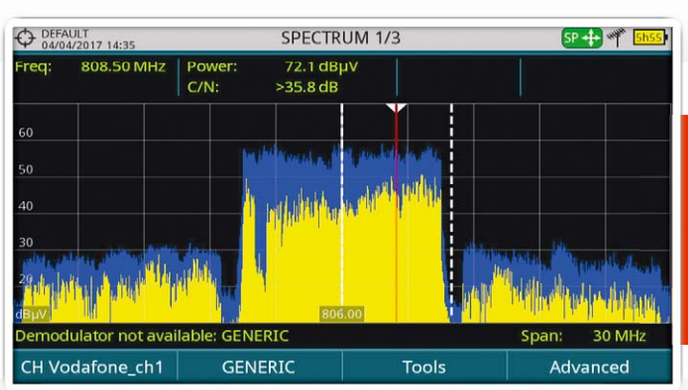
Downlink interference comes from the mobile phone base stations which are placed at fixed locations and are always on. This is not the case of Uplink interference which comes from the handheld devices and therefore it can be a lot more difficult to locate and mitigate.



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.

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 ATSC ISDB-T Versions

RANGER *Neo* +

Web Server remote control

Merogram and Spectrogram

Fibre optics and GPS options

More than 4 hours battery time

DVB ATSC ISDB-T Versions

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

H.265 H-265 HEVC analyzer and decoder

4K ULTRAHD

WiFi analyzer

T2-MI de-encapsulation and analysis

Transport stream recorder and analyzer

Webserver control via Ethernet port

Optional DAB and DAB+ digital radio

Optional optical power meter and RF converter

CAM Common Interface slot for encrypted channels

Digital Channel Stacking Switch LNB (dCSS)

Optional GPS for signal coverage analysis

ip.tv Extended IPTV functions

6GHz Optional 6 GHz RF input

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 ATSC ISDB-T versions

RANGER *Neo* 3

- Network Delay Margin
- T2-MI analysis
- GPS for drive test measurements
- DAB/DAB+ digital radio
- DVB version

RANGER *Neo* 4

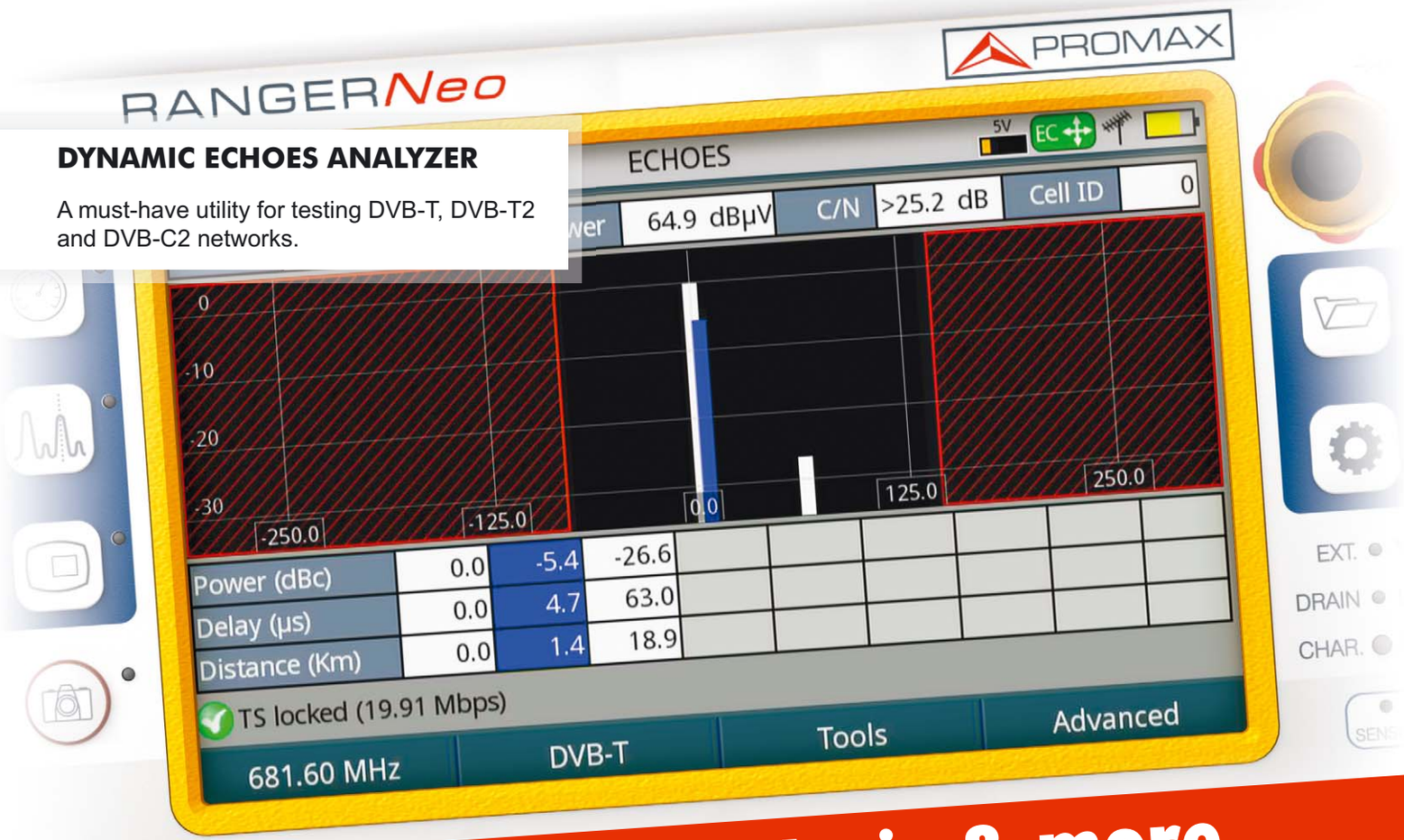
- 4K decoder
- DVB version

PROMAX

RANGERNeo

DYNAMIC ECHOES ANALYZER

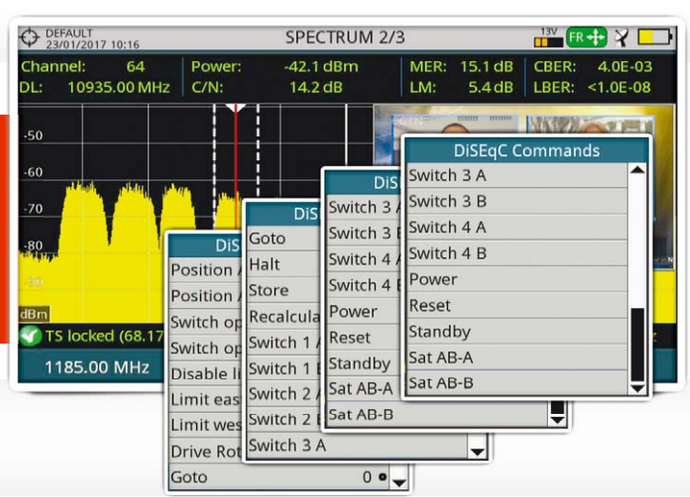
A must-have utility for testing DVB-T, DVB-T2 and DVB-C2 networks.

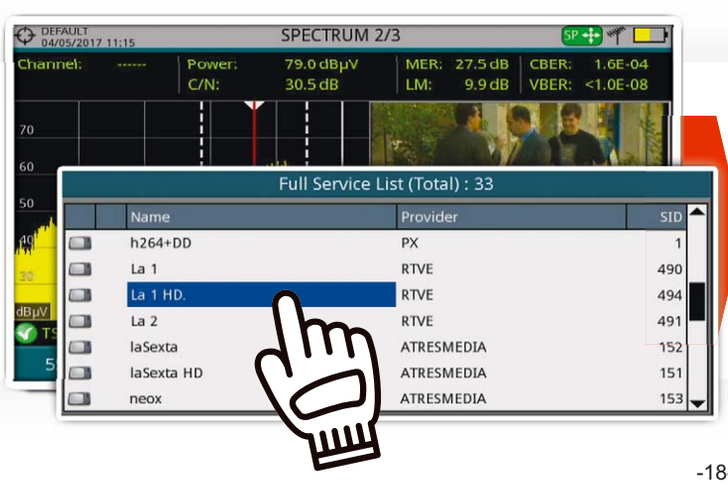


Dynamic echoes analysis & more

DiSEqC commands

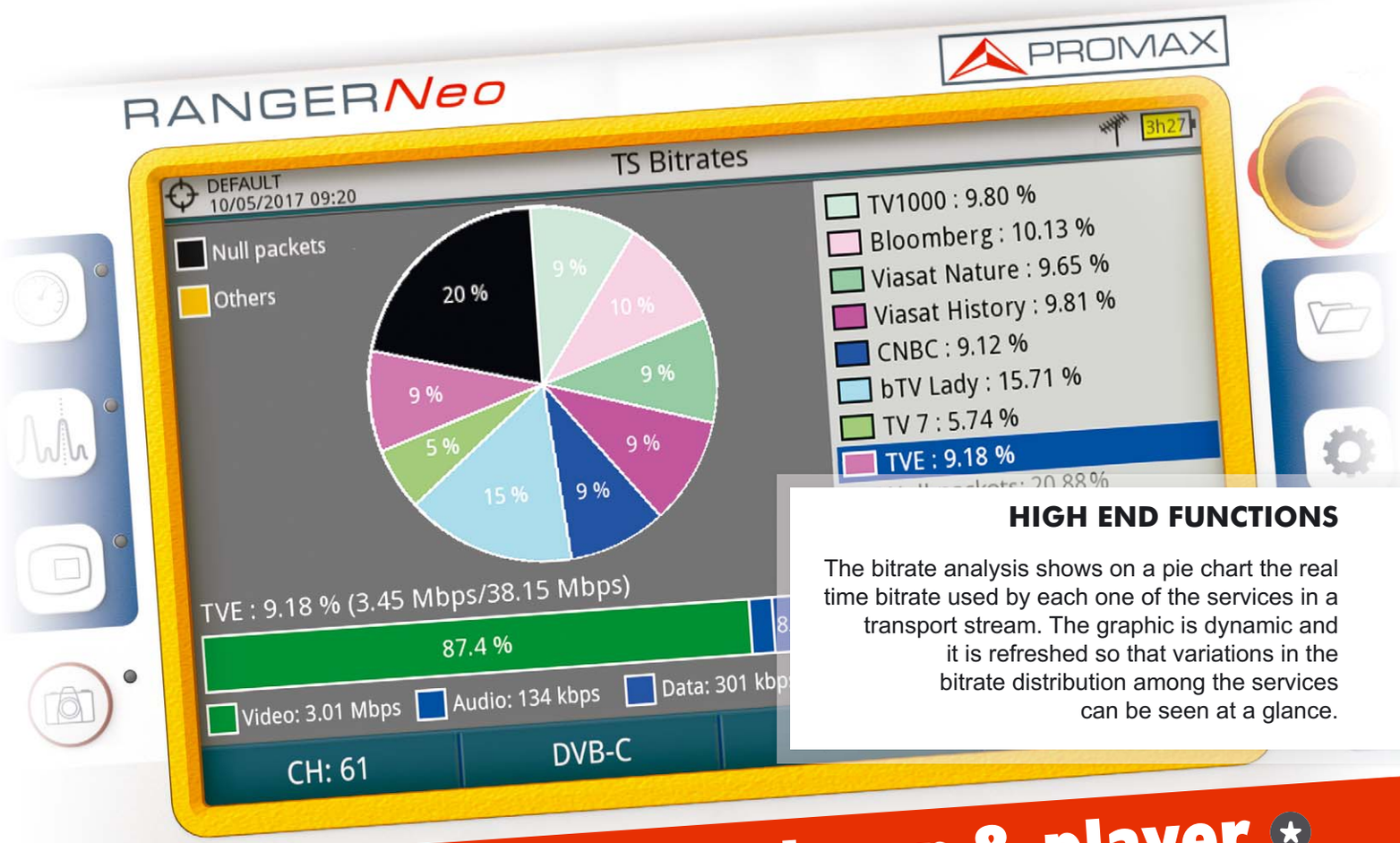
Elementary DiSEqC commands are available from a drop-down list. They can be combined to form macros which can also be associated to a channel table.





Digital services database

RANGER*Neo* builds a list of the TV and RADIO services detected as it tunes the different digital channels. Besides tuning by frequency and channel It is then possible to select a specific service from the list.



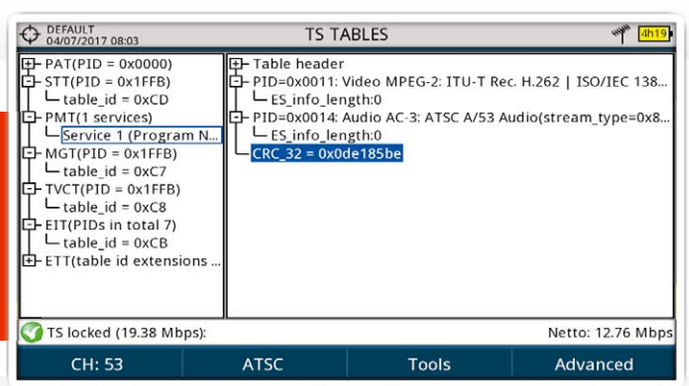
HIGH END FUNCTIONS

The bitrate analysis shows on a pie chart the real time bitrate used by each one of the services in a transport stream. The graphic is dynamic and it is refreshed so that variations in the bitrate distribution among the services can be seen at a glance.

Transport stream analyzer & player ★

Table analysis ★

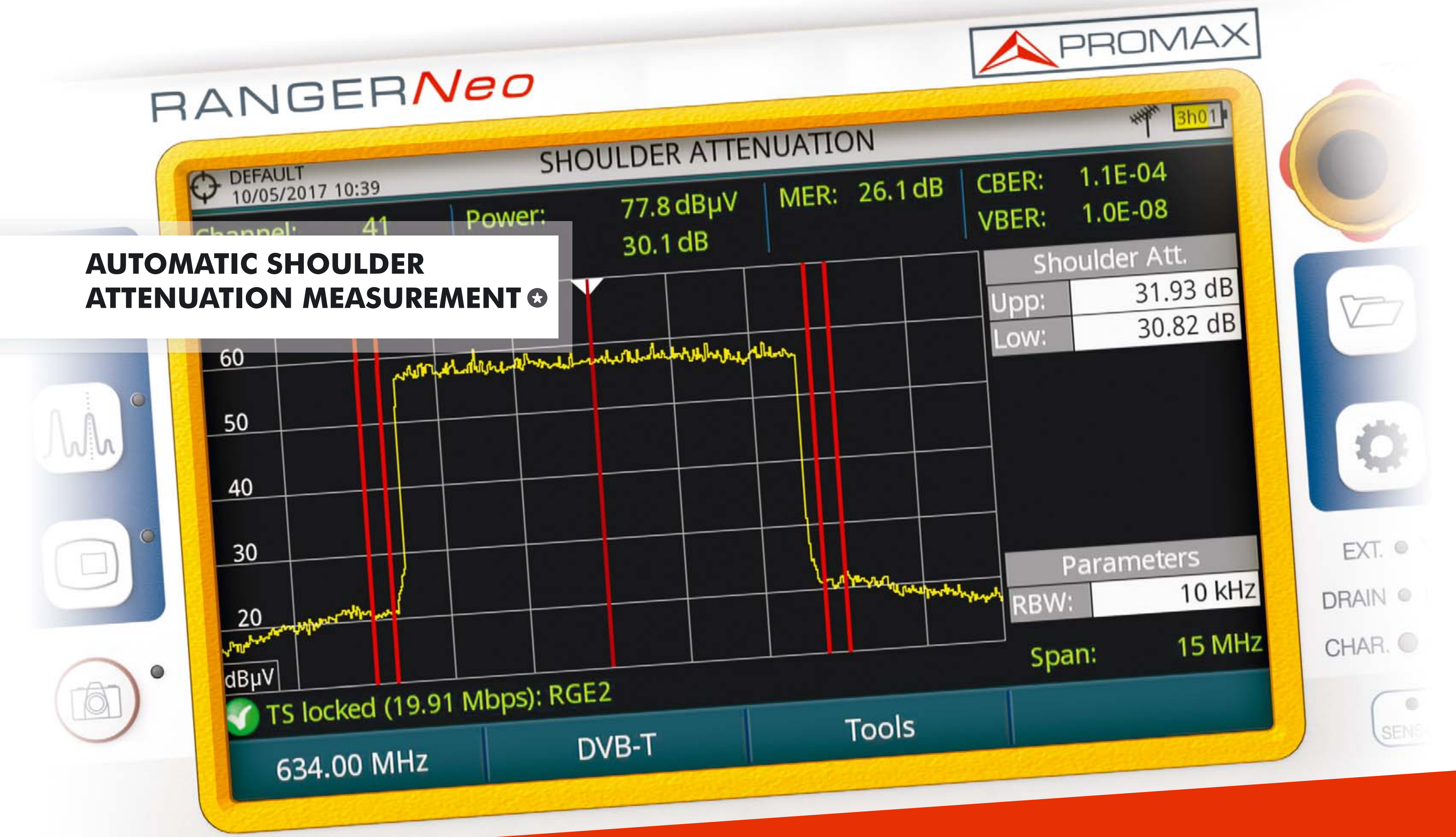
This function shows every detail of the transport stream tables in real time on a tree diagram. This is an outstanding function which is normally only available in more expensive equipment. It is possible to navigate through the tree branches using the joystick or the touch screen functionality.



Record, analyze, decode and copy a Transport stream ★

A function available for **RANGER*Neo*** that enables the instrument to capture the received TS in real time into its internal memory. The recorded TS can then be decoded, analyzed or copied to a USB *pendrive* directly connected to the instrument.

★ CHECK COMPARISON TABLE

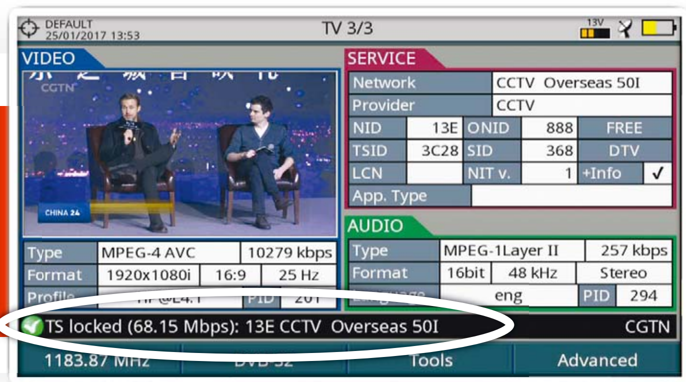


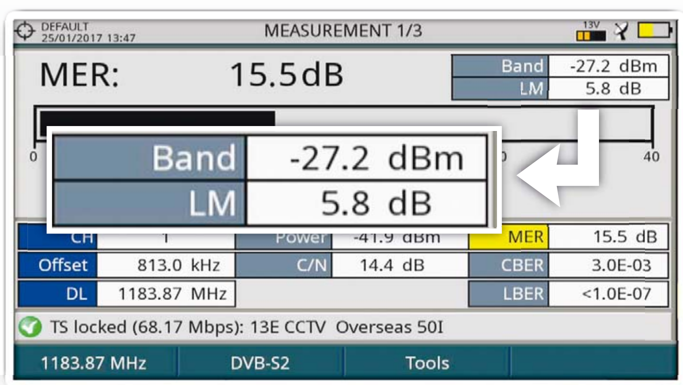
AUTOMATIC SHOULDER ATTENUATION MEASUREMENT

Productivity tools

StealthID

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

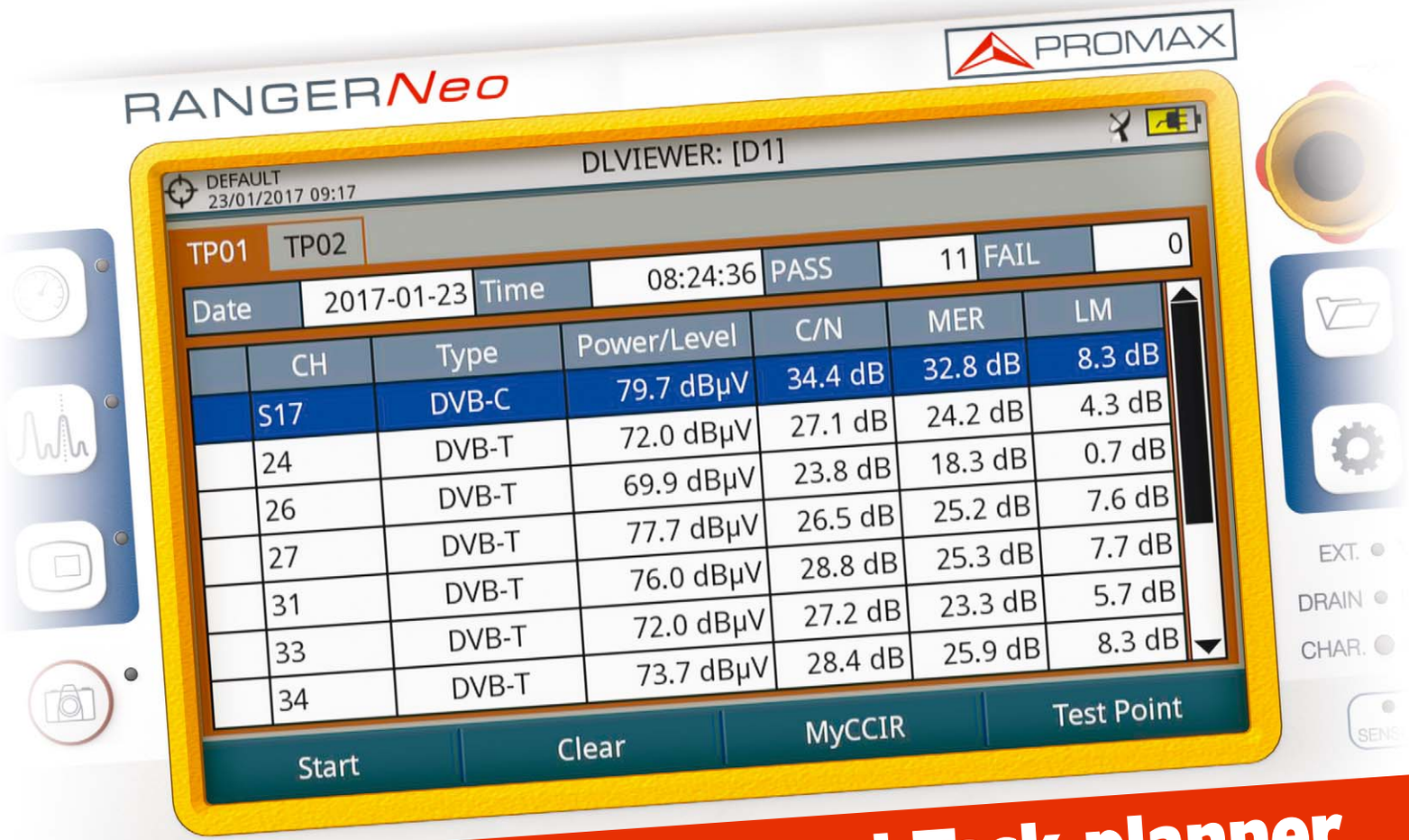




Full band power

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

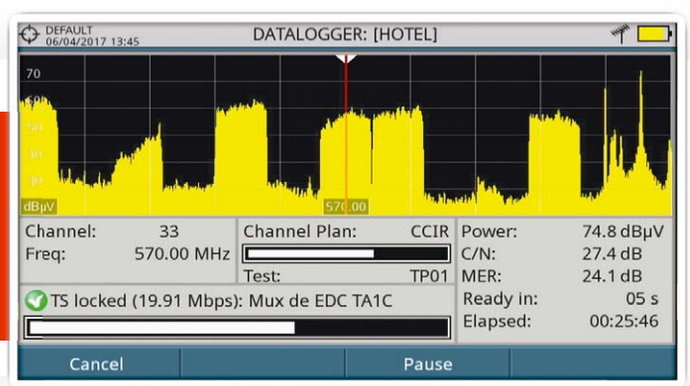
CHECK COMPARISON TABLE

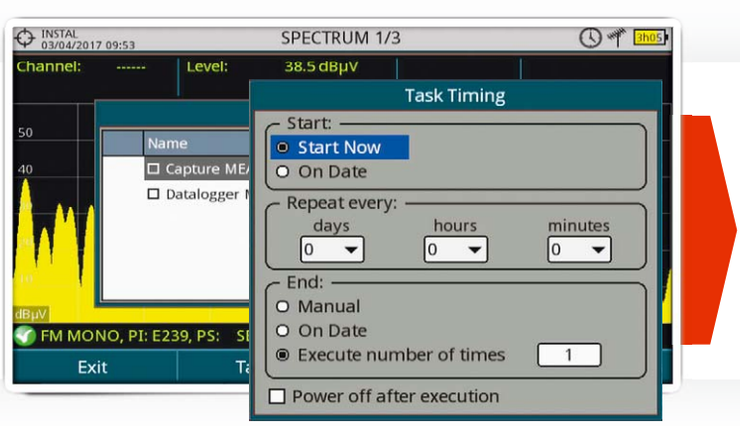


Powerful datalogger and Task planner

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

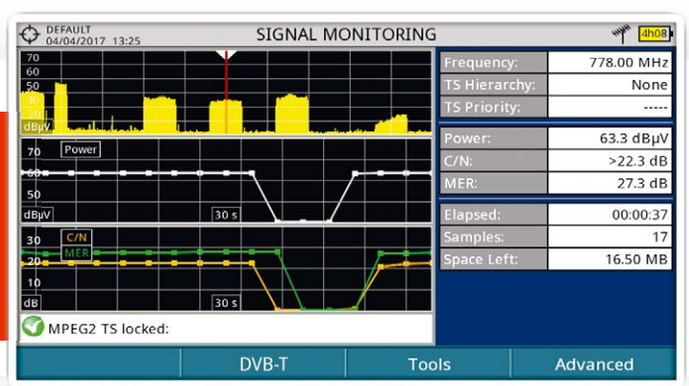
This function allows to set-up a task list, both for screen capture or Datalogger acquisition, selecting when to start, a repetition rate and the number of times the selected task must be performed. The equipment can be switched off after setting all parameters and will itself wake-up, at the required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

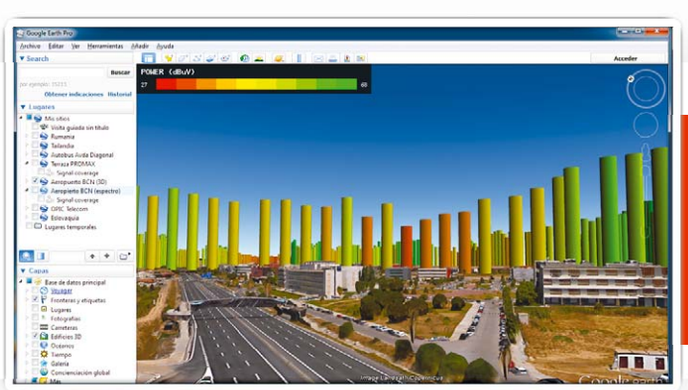
Drive test GPS ★

Create 3D maps with your measurements

Coverage analysis and GPS

This option turns the **RANGER*Neo*** into the perfect tool to perform signal coverage “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 a 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.

FREE ONLINE TOOL TO GENERATE KML FILES

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.

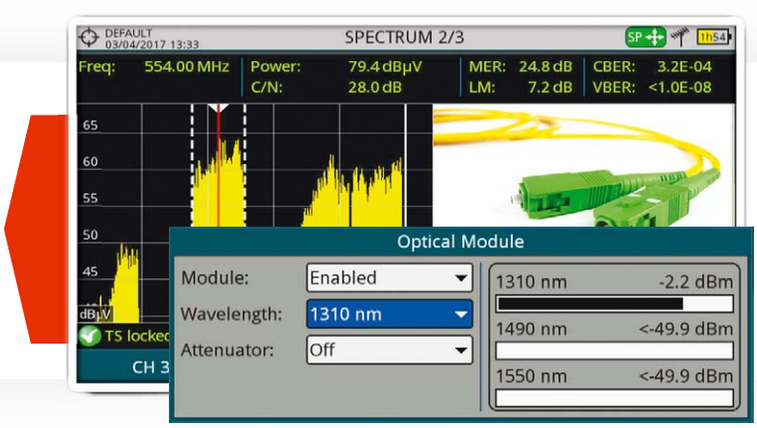
KML EXCEL EXCEL CSV

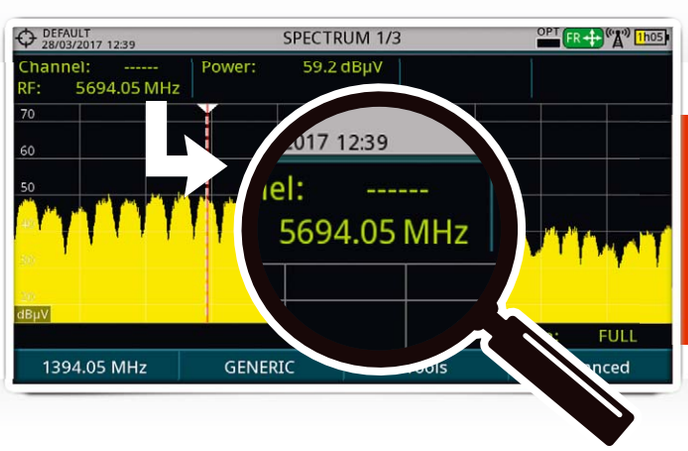
Optical measurements ★

... 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.



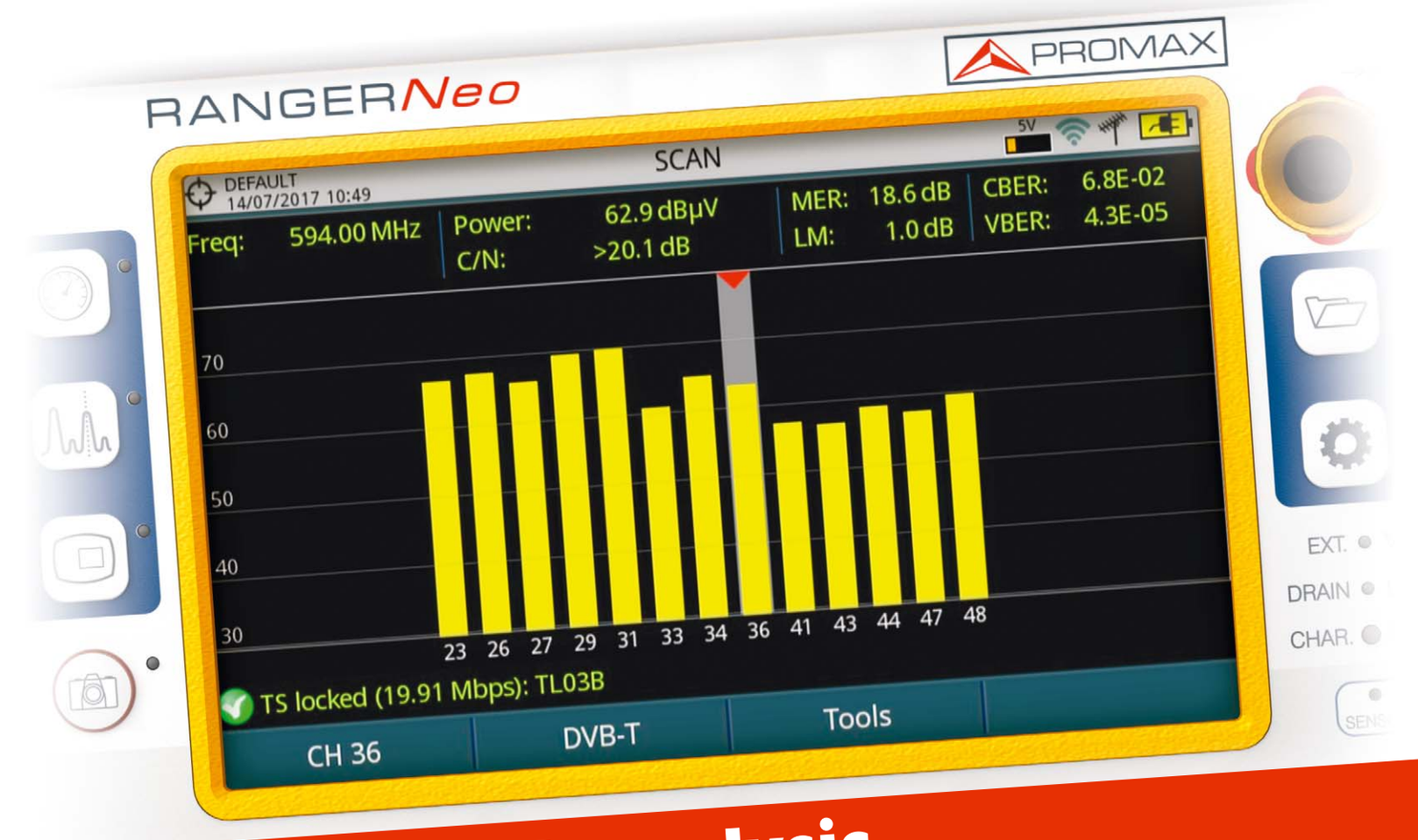


6 GHz RF auxiliary input

The **RANGER*Neo*** 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 2000 MHz to 3000 MHz
Band II	From 3400 MHz to 4400 MHz
Band III	From 4400 MHz to 6000 MHz

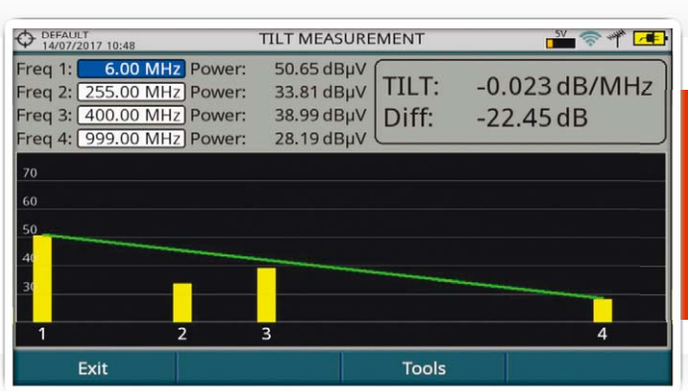
★ CHECK COMPARISON TABLE



CATV network analysis

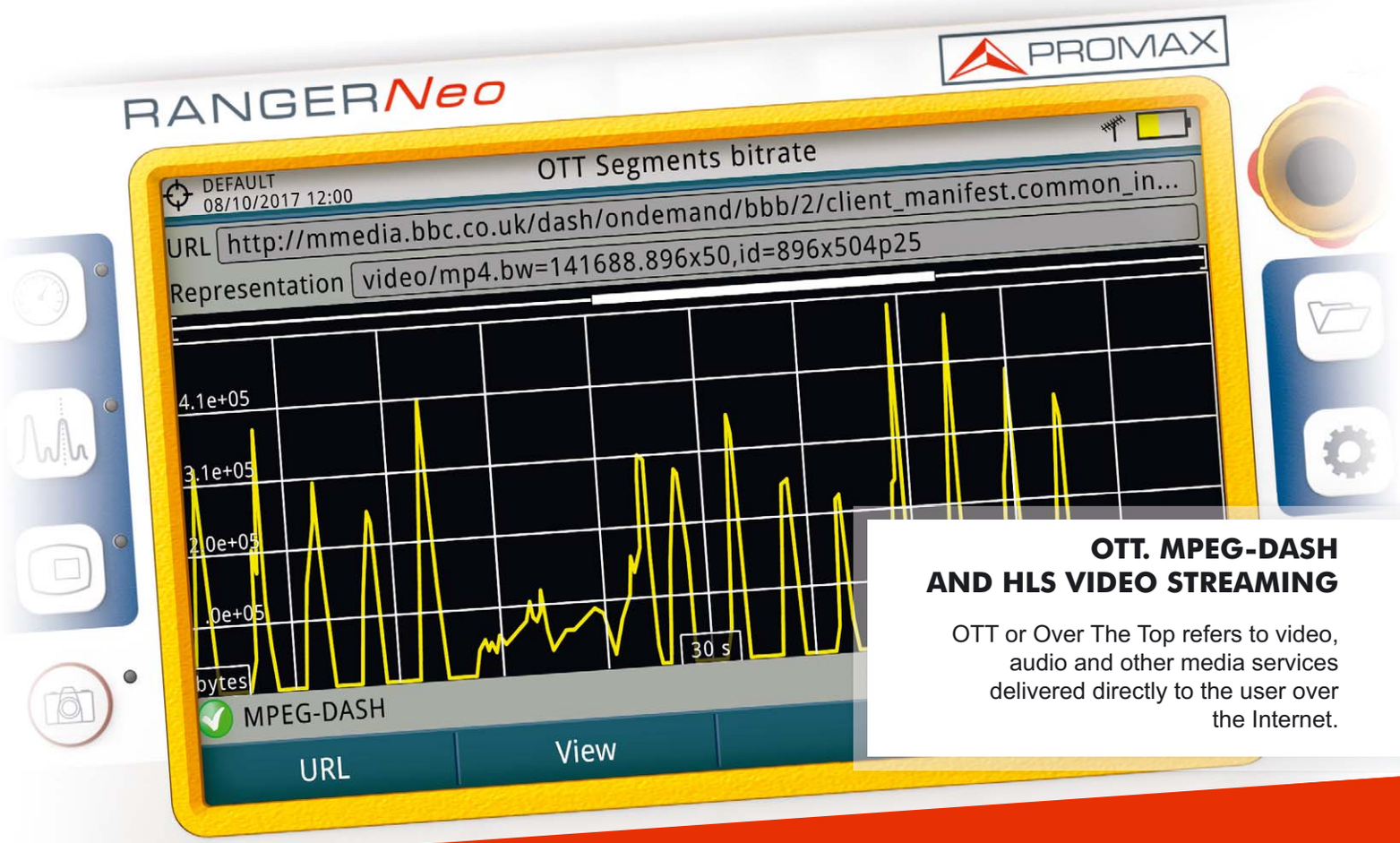
SCAN

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

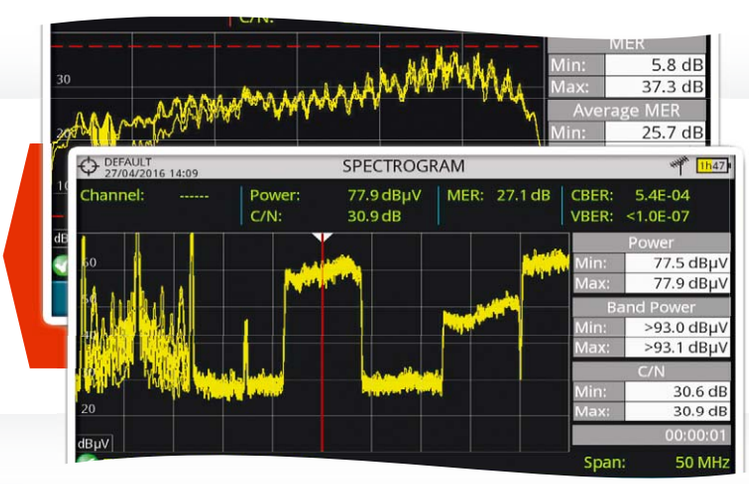
Using pilot generators as a reference, the TILT feature helps us to equalize the CATV network. We can detect as many as 4 pilots along the band from 6 – 999 MHz. The meter will calculate the level difference between the two most distant pilots and the tilt measurement (dB/MHz).



OTT. MPEG-DASH AND HLS VIDEO STREAMING

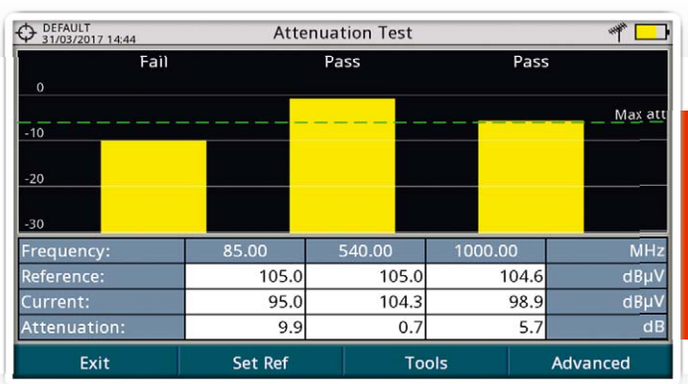
OTT or Over The Top refers to video, audio and other media services delivered directly to the user over the Internet.

Many useful functions



Merogram and Spectrogram

These functions have been developed to allow an early detection of intermittent impairments that may occur in very short periods of time and can not be monitored otherwise.



Attenuation test

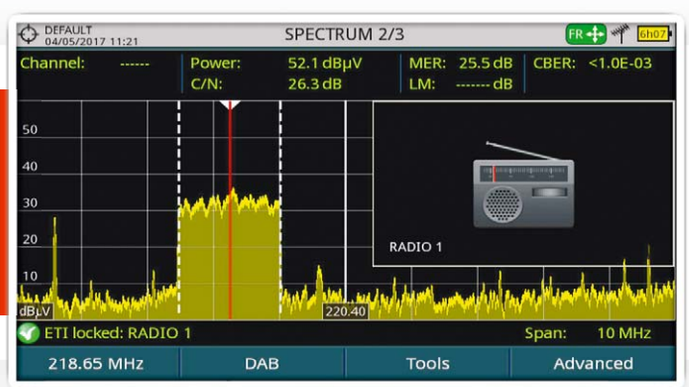
Test the frequency response of your installation using RP-050, RP-080, RP-110B signal generators.

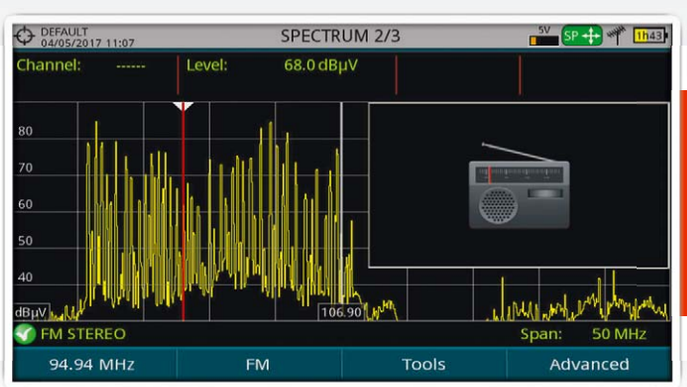
CHECK COMPARISON TABLE

FM, RDS and DAB+ radio ★

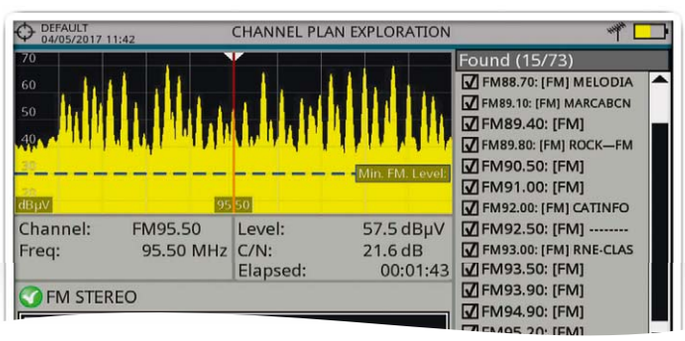
DAB+ digital radio ★

DAB+ is an evolution of DAB (*Digital Audio Broadcast*) that among other differences uses AAC+ audio codec. It also includes Reed-Solomon error correction algorithm which makes it more robust against transmission impairments. **RANGER*Neo*** DAB option is compatible with both standards.





FM radio receiver and analyzer

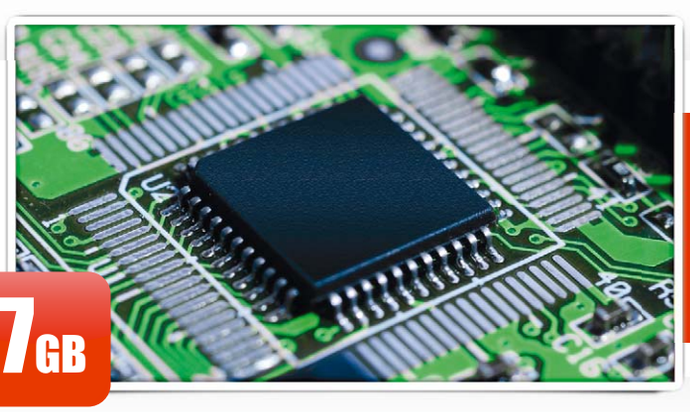


★ CHECK COMPARISON TABLE

Create, save and transfer data

Ethernet connectivity

Ethernet and IP protocols are now the gold standards for remote control applications and **RANGER*Neo*** 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.



More internal memory: Up to 7 GB

There is more data a **RANGER*Neo*** can store in the internal memory, dataloggers, screen shots, signal monitoring files, etc. However, it is the transport stream recording what uses up memory faster. Even though the information can be downloaded to a PC or even copied to a *pendrive* in the field, the 7 GB of internal memory in the **RANGER*Neo*** are far from negligible.

Field strength measurements

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

Soft bag and hard case ✪

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

CHECK COMPARISON TABLE

Extended connectivity features ★

Transport stream input and output

RANGER*Neo* 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*** 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*** 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.

Video input

A RCA to jack adapter is also included for SD composite video input in all **RANGER*Neo*** products.

USB and Ethernet connections

RANGER*Neo* 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	RANGER*Neo* +	RANGER*Neo* 2	RANGER*Neo* 3	RANGER*Neo* 4
DIGITAL BROADCAST STANDARDS	DVB-T/T2, DVB-T2 lite DVB-C/C2 DVB-S/S2 DVB-S2 Multistream DSS, ACM / VCM / CCM	*... Also includes:* DAB, DAB+ (optional)	*... Also includes:* MPEG-TS	*... Also includes:* DVB-T2-MI DAB, DAB+	
AUDIO CODECS	MPEG-1, MPEG-2, HE-AAC, Dolby Digital, Dolby Digital Plus				
VIDEO CODECS	MPEG-2, MPEG-4 / H.264, HEVC / H.265				
INPUTS AND OUTPUTS	- Universal RF input 75 Ω - HDMI output - IP interface for remote control - Analogue Video/Audio input - 2xUSB (Type-A) for data transfering		*... Also includes:* - ASI-TS input and output (BNC Female, 75 Ω) - IPTV multicast input (UDP / RTP, RJ45) - Common Interface slot	*... Also includes:* - 1 pps input	
FUNCTIONS	- Constellation diagram - LTE ingress test - Dynamic echoes analysis - StealthID (instant identification of tuning parameters) - PLS (Physical Layer Scrambling) - Ultra fast spectrum analyzer (70 ms sweep time) - 4K Frame grabber - MAX and MIN hold - FM RDS radio measurement and decoding - Screenshots and Datalogger for meas.reports - Beacon-Flyaways SND and VSAT - Wideband LNB - WiFi 2.4 GHz - LTE 1.8 GHz - OTT - Service Recording - Field strength measurement - Task planner	*... Also includes:* - Merogram - Spectrogram - Signal monitoring - Remote control (webserver) - MER by carrier - GPS coverage analysis (optional) - Video/Audio Streaming - SCAN + TILT	*... Also includes:* - TS recording - TS analysis - IPTV multicast measurement and decoding - Shoulder attenuation	*... Also includes:* - Network delay - DVB-T2-MI analysis	*... Also includes:* - 4K decoder
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 (please refer to STANDARDS section) Frequency Margin DVB-T COFDM DVB-T2 Base and Lite COFDM DVB-C QAM DVB-C2 COFDM PAL, SECAM and NTSC FM radio DVB-S QPSK DVB-S2 QPSK, 8PSK, 16/32APSK DSS QPSK	From 5 - 1000 MHz (Terrestrial) From 250 - 2350 MHz (Satellite) Power (35 to 115 dBµV), CBER, VBER, MER, C/N, Link margin Power (35 to 115 dBµV), CBER, C/N, LBER, MER, Link Margin, BCH ESR, LDP iterations, Wrong packets Power (45 to 115 dBµV), BER, MER, C/N, Link margin Power (45 to 115 dBµV), CBER, MER, C/N, LBER, BCH ESR, LDP iterations, wrong packets 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	7 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* +	RANGER*Neo* 2	RANGER*Neo* 3	RANGER*Neo* 4
DAB, DAB+	Available	Available	Included	Included
GPS Coverage Analysis	Available	Available	Included	Included
Rack assembly	Available	Available	Available	Available
OPM + Optical-to-RF converter + WiFi 5 GHz + LTE 2.6 GHz + 6 GHz RF input	Available	Available	Available	Available
WiFi 5 GHz + LTE 2.6 GHz + 6 GHz RF input	Available	Available	Available	Available

RANGERNeo TV analyzers

A new breed of analyzers for a new world

✓ Included
● Optional

ALL VERSIONS
DVB MODELS ONLY
ISDB-T MODELS ONLY
ATSC MODELS ONLY

	RANGER Neo 4	RANGER Neo 3	RANGER Neo 2	RANGER Neo +	RANGER Neo Lite	HD RANGER UltraLite	HD RANGER Eco
4K decoder	✓						
HEVC H.265 decod. + 4K Frame Grabber	✓	✓	✓	✓	✓		
MPEG-2 and MPEG-4 H.264 decoder	✓	✓	✓	✓	✓	✓	✓
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	1x Mini USB	1x Mini USB
Battery time	> 4 hours	> 4 hours	> 4 hours	> 4 hours	> 2 hours	> 2 hours	> 2 hours
Resolution filter 100 kHz	✓	✓	✓	✓	✓	✓	✓
Resolution filters 200 kHz, 1 MHz	✓	✓	✓	✓		✓	
Resolution filters 2, 10, 20, 30, 40 kHz	✓	✓	✓				
Echoes analysis	✓	✓	✓	✓	✓	✓	✓
Constellation diagram	✓	✓	✓	✓	✓	✓	✓
Web server and Vídeo/Audio Streaming	✓	✓	✓	✓			
Spectrogram and Merogram	✓	✓	✓	✓			
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	✓	✓					
GPS for drive test	✓	✓	●	●			
DAB/DAB+ digital radio	✓	✓	●	●			
5 GHz WiFi + 2.6 GHz LTE + 6 GHz RF in	●	●	●	●			
Optical measurements and optical to RF converter	●	●	●	●			
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			✓				