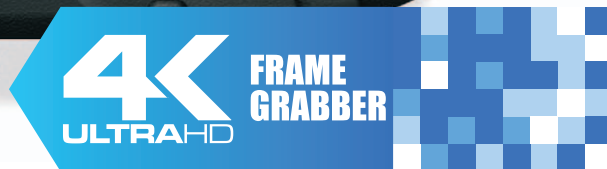




FIELD STRENGTH METERS & SPECTRUM ANALYZERS

BROADCAST, CABLE, SATELLITE, IPTV, OPTICAL AND WIFI

RANGER *Neo*



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



High efficiency Video Codec



in field strength
rs from
ing.

RANGER*Neo*

SPECTRUM 2/3

Channel: 49 Power: -51.7 dBm MER: 17.7 dB CBI
DL: 10258.75 MHz C/N: 16.6 dB LM: 9.5 dB LBR

Channel (61.28 Mbps): 13E Polsat

508.75 MHz

★ CHECK COMPARISON TABLE

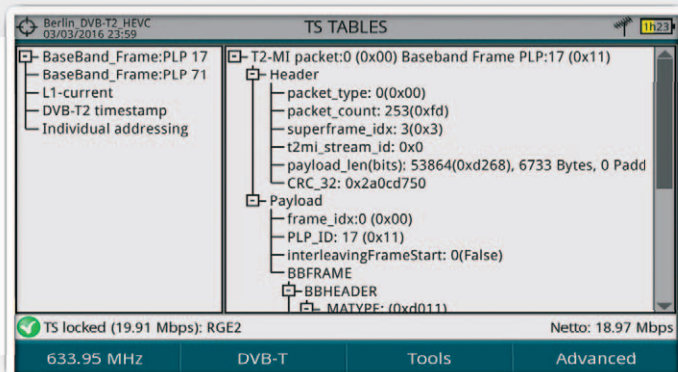
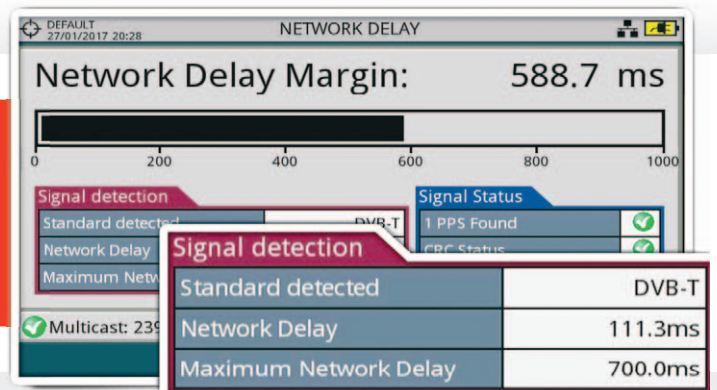
Tools



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, i.e 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.

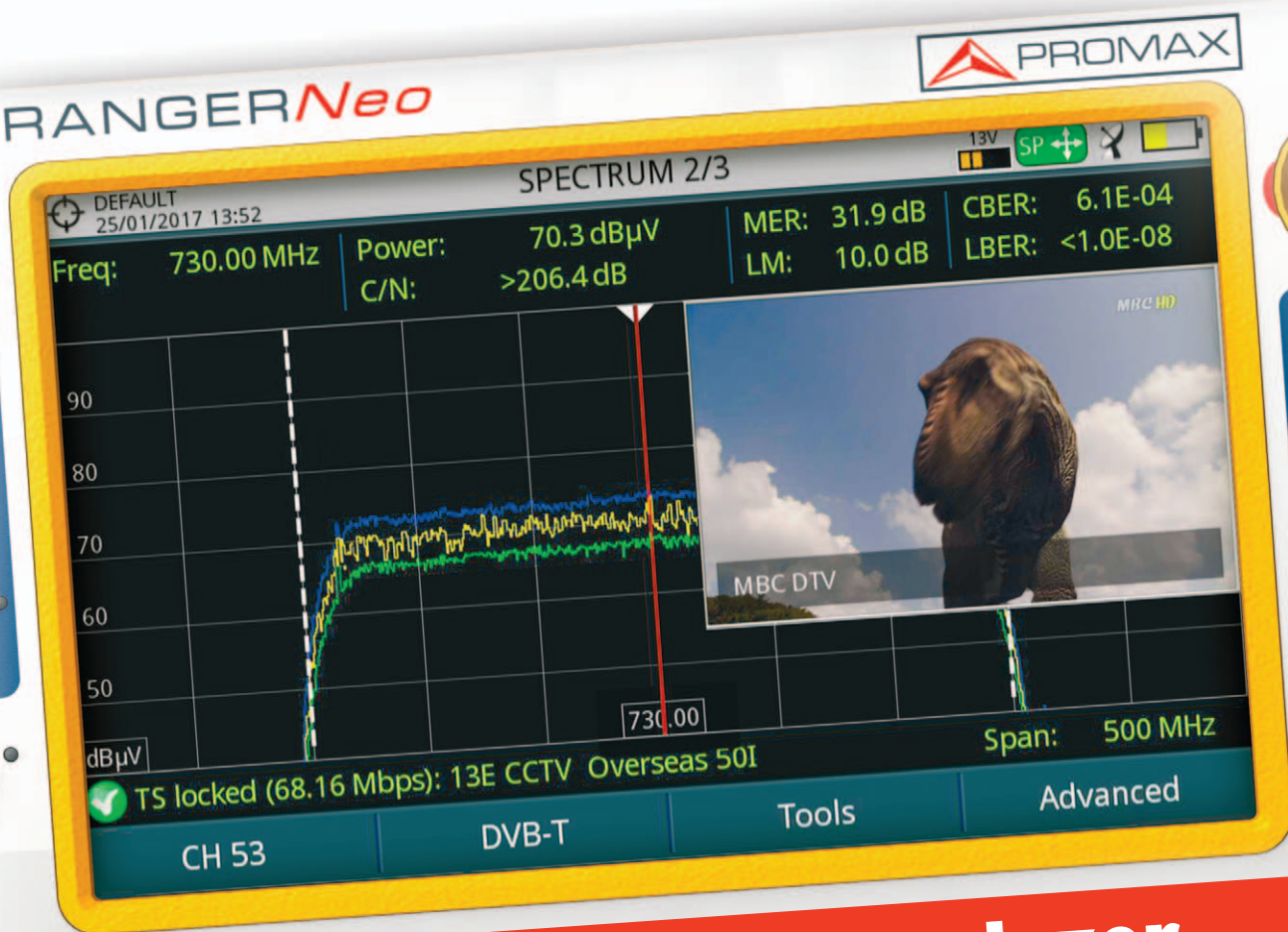


Receiving and analyzing T2-MI signals ⚙

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.

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

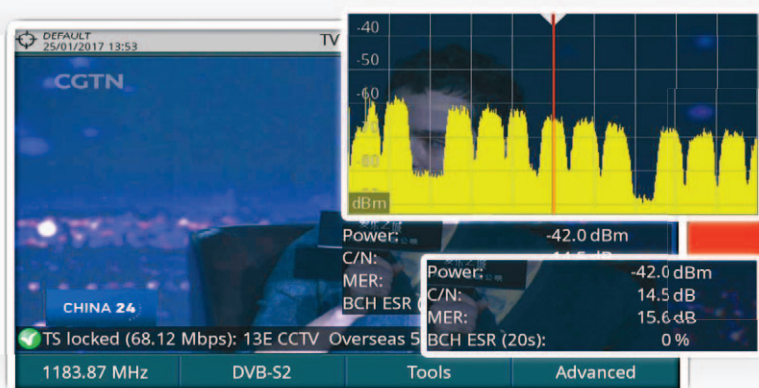
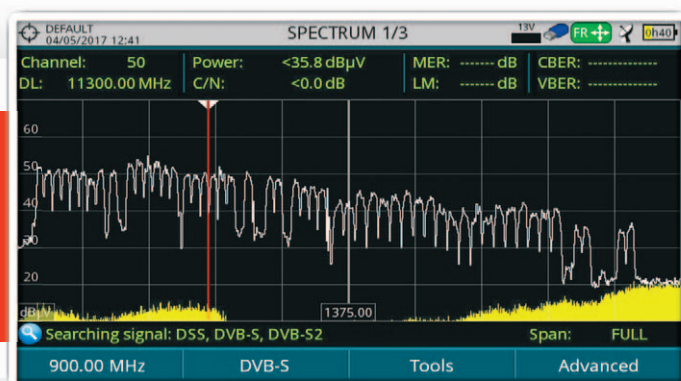
RANGER Neo



Professional spectrum analyzer

Reference traces

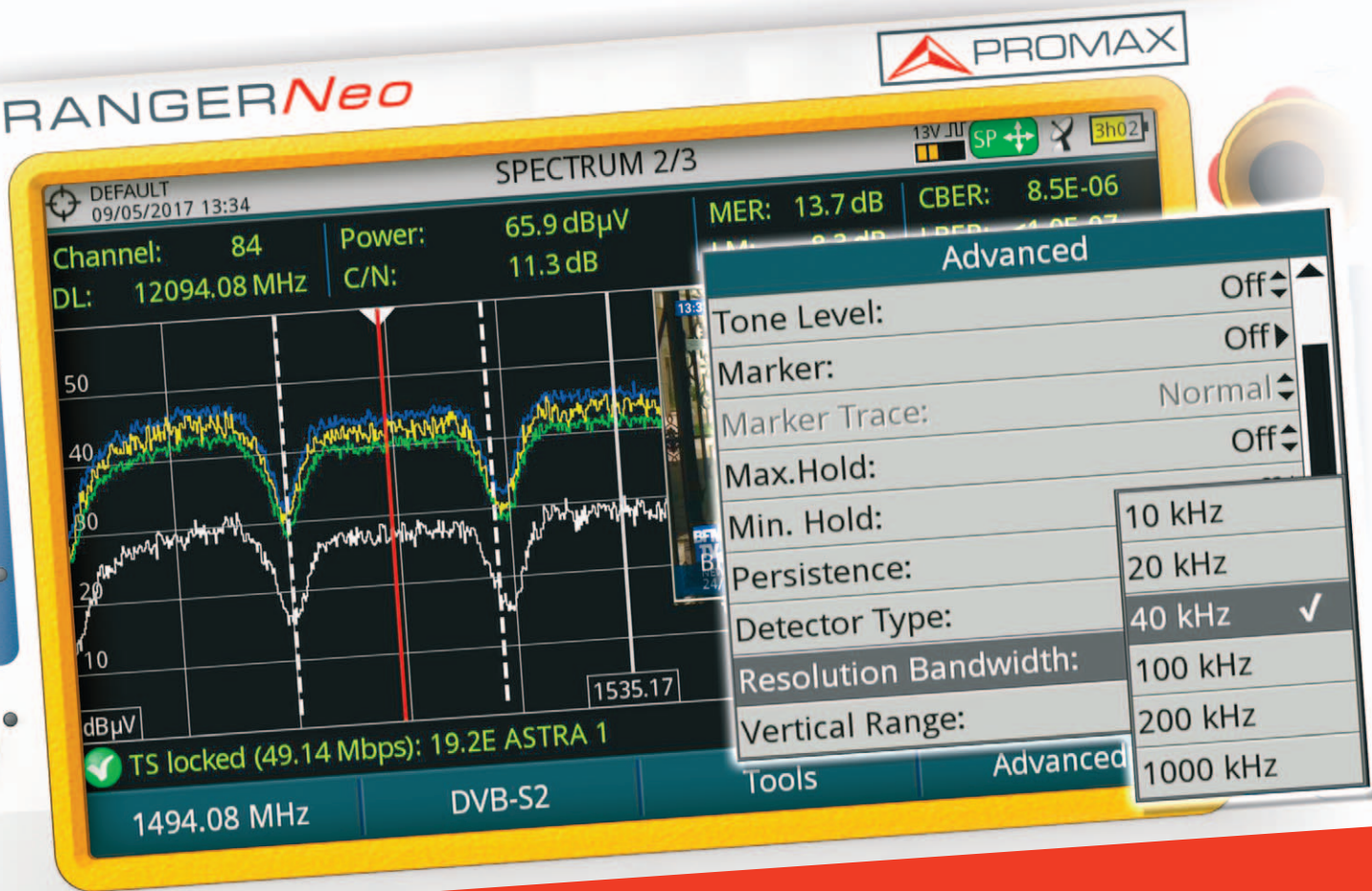
Freeze the spectrum graph and compare it with the running trace. Save that information and use it to identify satellites based on their spectrum footprint.



Triple split display

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

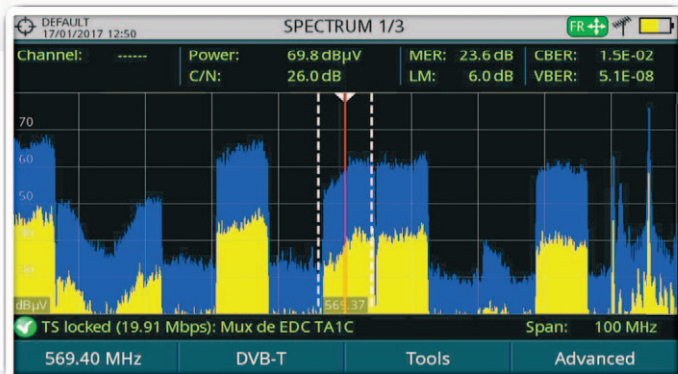
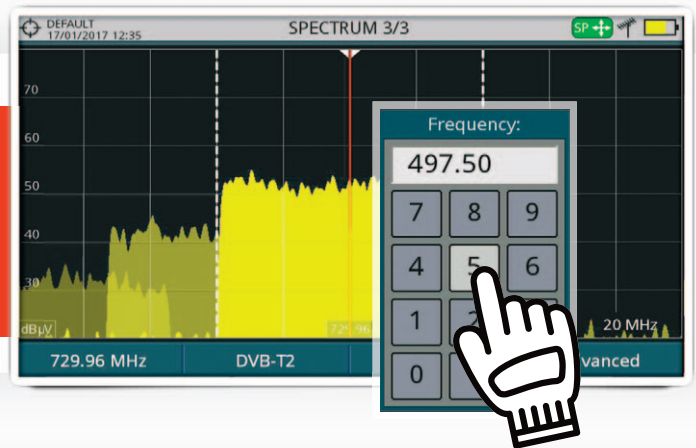
RANGER^{Neo}



High resolution filters ★

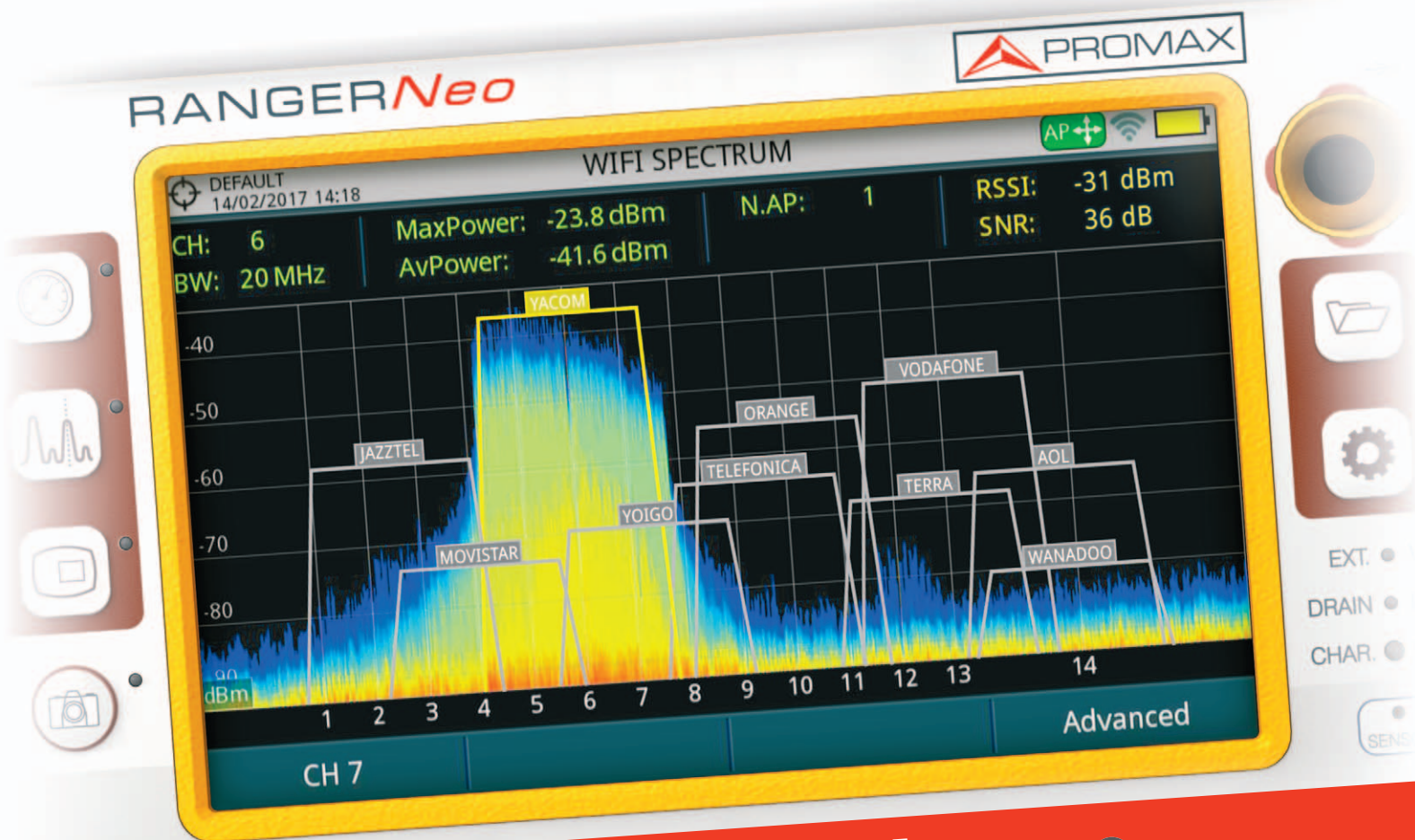
Touch screen

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

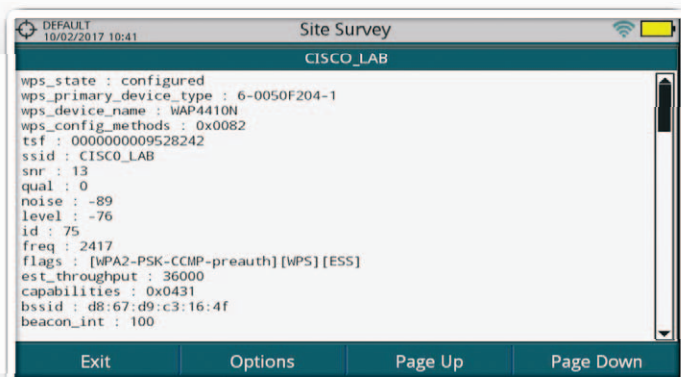
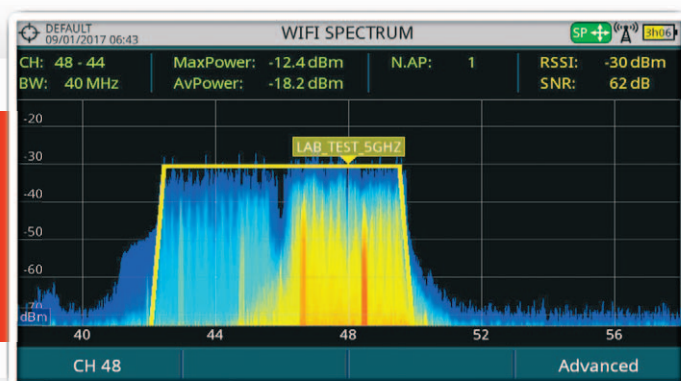
Display them separately or simultaneously along with the current spectrum trace.



2.4 & 5.7 GHz WiFi analyzer ★

Simultaneous real spectrum analyzer information + WiFi access point data

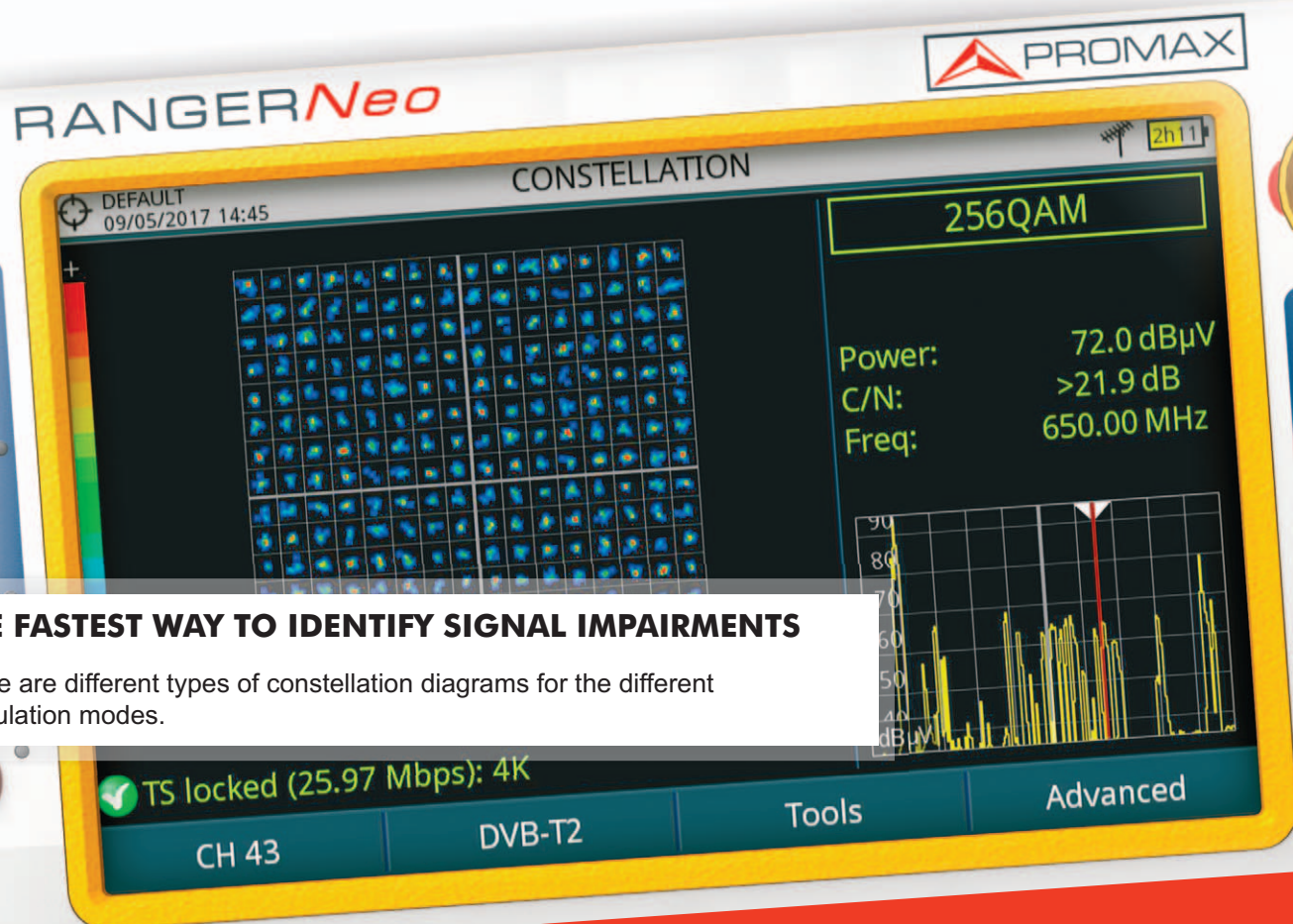
WiFi signals can be disturbed by interference from other WiFi stations, for example other access points, but also from non-WiFi signals such as wireless CCTV cameras or a microwave oven. **RANGERNeo** can display real spectrum analyzer information and access point data simultaneously.



Access point information

RANGERNeo 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.





THE FASTEST WAY TO IDENTIFY SIGNAL IMPAIRMENTS

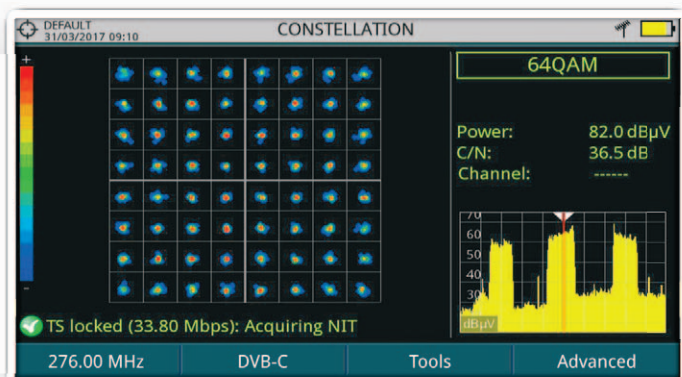
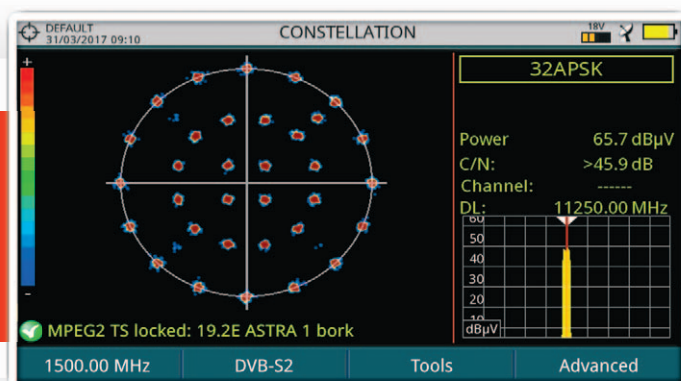
There are different types of constellation diagrams for the different modulation modes.

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

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.

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

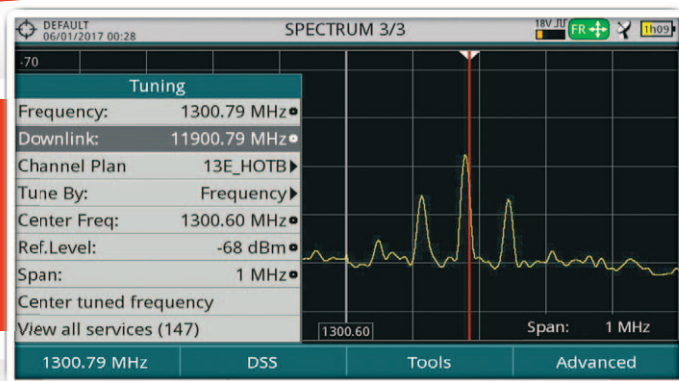
Satellite BEACON signals can be clearly seen thanks to the 1 MHz SPAN and 10 kHz resolution filters.

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



VCM / ACM modulation schemes

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



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.

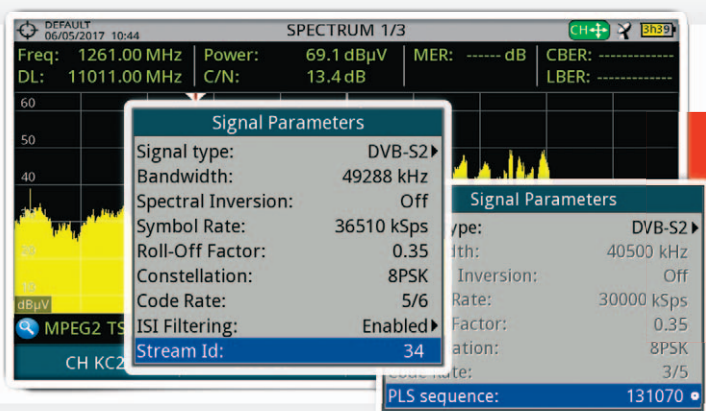
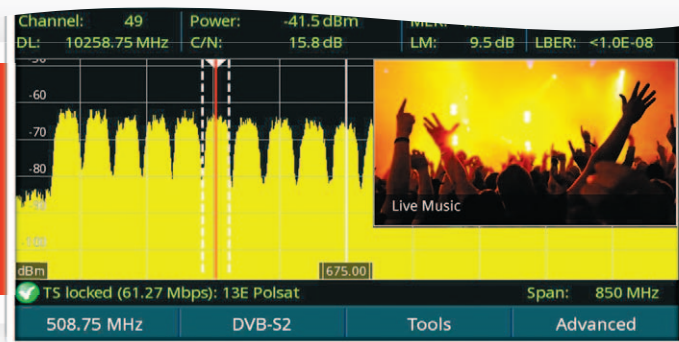
Mode code	QPSK CR=1/2 PILOTS=ON FRAME=...
Mode code	QPSK CR=2/3 PILOTS=ON FRAME=...
Mode code	QPSK CR=3/4 PILOTS=ON FRAME=...
Mode code	QPSK CR=4/5 PILOTS=ON FRAME=...
Mode code	QPSK CR=5/6 PILOTS=ON FRAME=...
Mode code	8PSK CR=3/5 PILOTS=ON FRAME=...
Mode code	8PSK CR=2/3 PILOTS=ON FRAME=...
Mode code	32APSK CR=3/4 PILOTS=ON FRAM...



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.

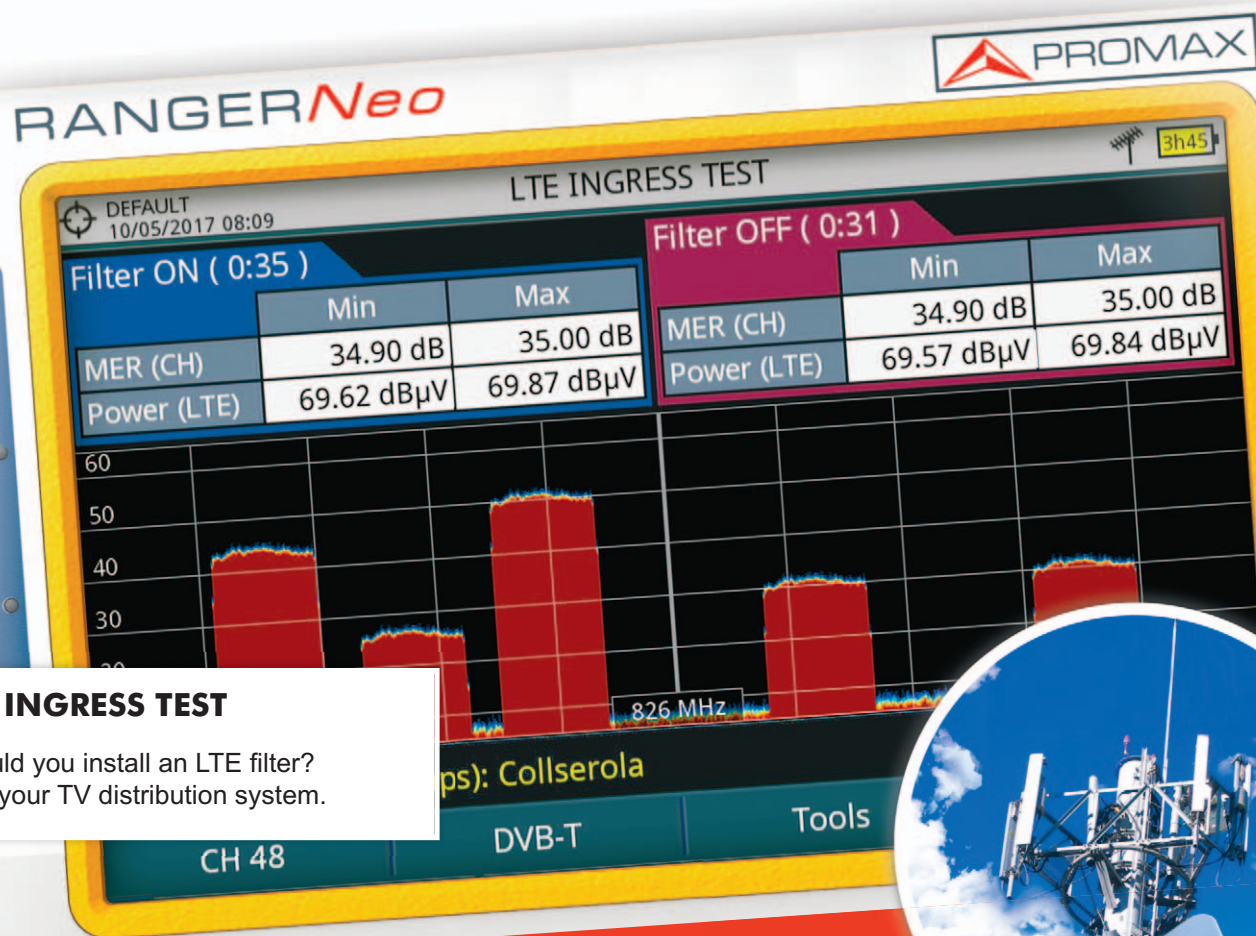


PLS - Physical Layer Scrambling

The PLS index is a number generated by the broadcaster that must be properly decoded by the customer so that demodulation is possible. **RANGERNeo** 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 **RANGERNeo** 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 **RANGERNeo** has a variety 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.



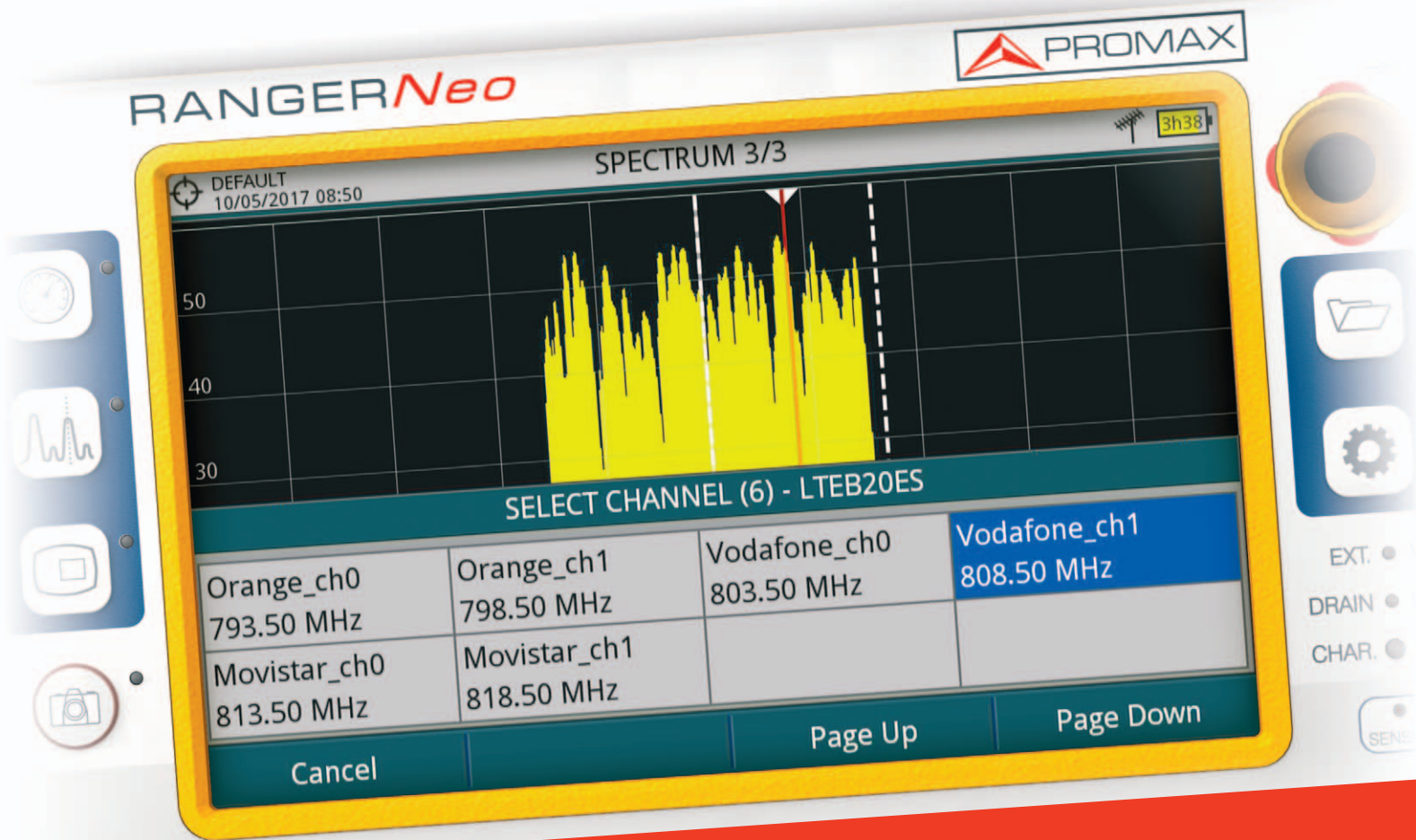
LTE interference on CATV networks

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 **RANGERNeo** 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.

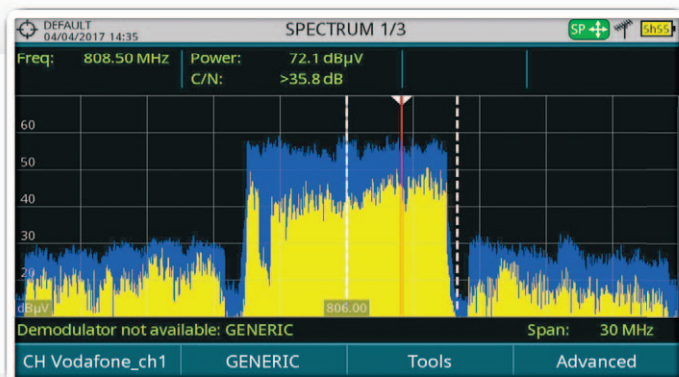
This is not the case of Uplink interference which comes from the handheld devices and therefore it can be a lot more difficult to locate and mitigate.



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.

RANGERNeo 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



RANGERNeo Lite

Touch screen

HEVC H.265 decoding

Wide band LNB Compatibility

Wi-Fi analyzer

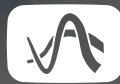
DVB **ATSC** **ISDB-T** versions

H.265

H-265 HEVC analyzer and decoder



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



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 **ATSC** **ISDB-T** 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 **ATSC** **ISDB-T** versions



RANGER Neo 3



Network Delay Margin

T2-MI analysis

GPS for drive test measurements

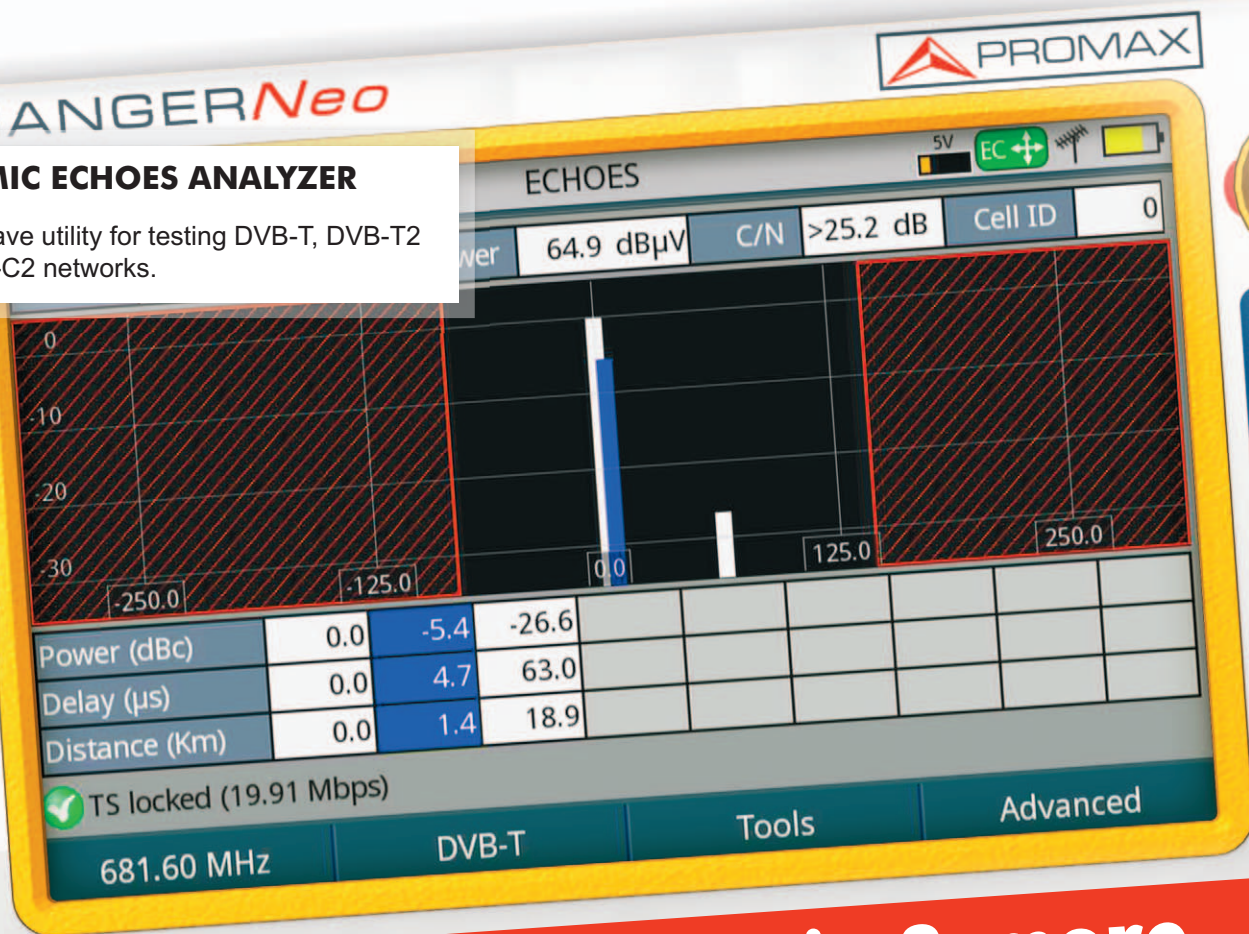
DAB/DAB+ digital radio

DVB version

RANGERNeo

DYNAMIC ECHOES ANALYZER

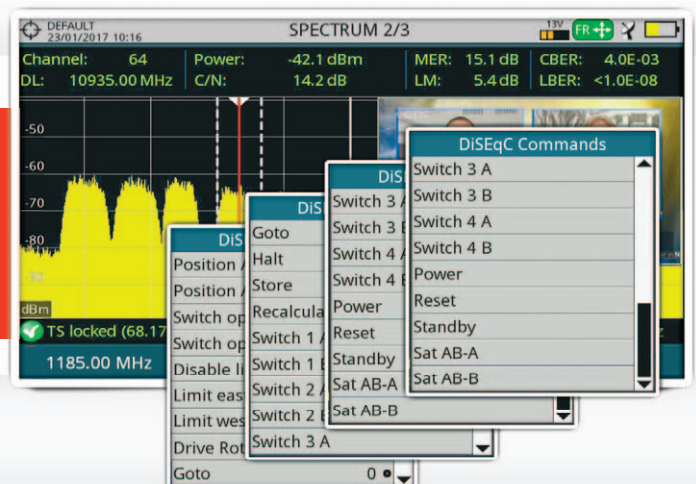
A must-have utility for testing DVB-T, DVB-T2 and DVB-C2 networks.



Dynamic echoes analysis & more

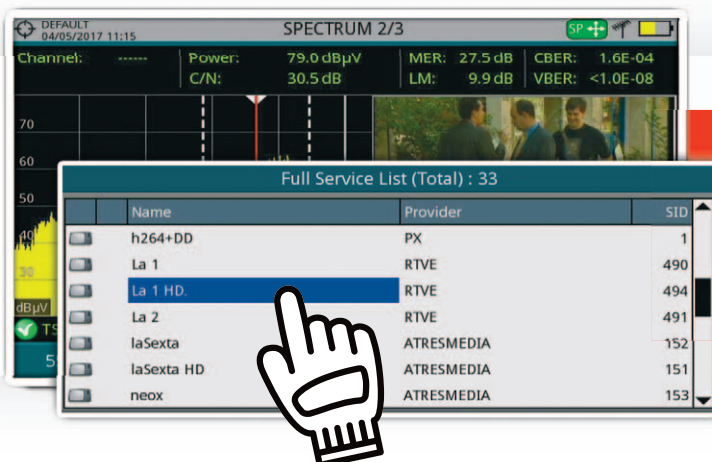
DiSEqC commands

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.

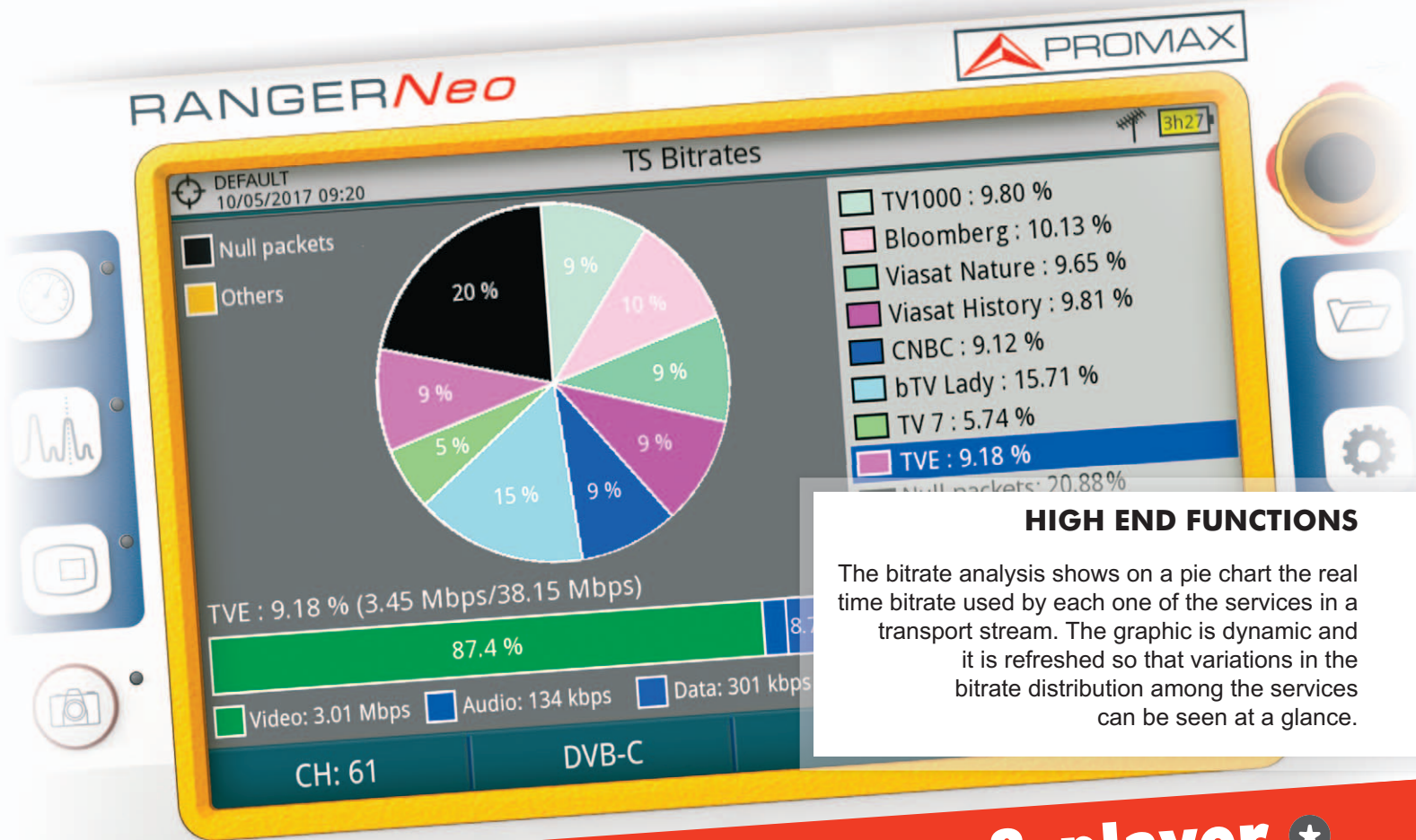


Digital services database

RANGERNeo 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.



Name	Provider	SID
h264+DD	PX	1
La 1	RTVE	490
La 1 HD	RTVE	494
La 2	RTVE	491
laSexta	ATRESMEDIA	152
laSexta HD	ATRESMEDIA	151
neox	ATRESMEDIA	153



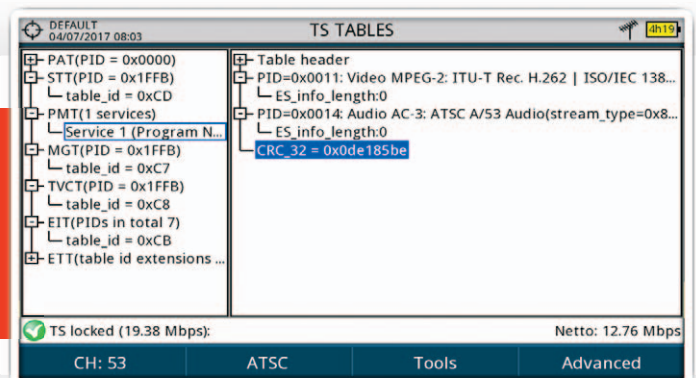
HIGH END FUNCTIONS

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.

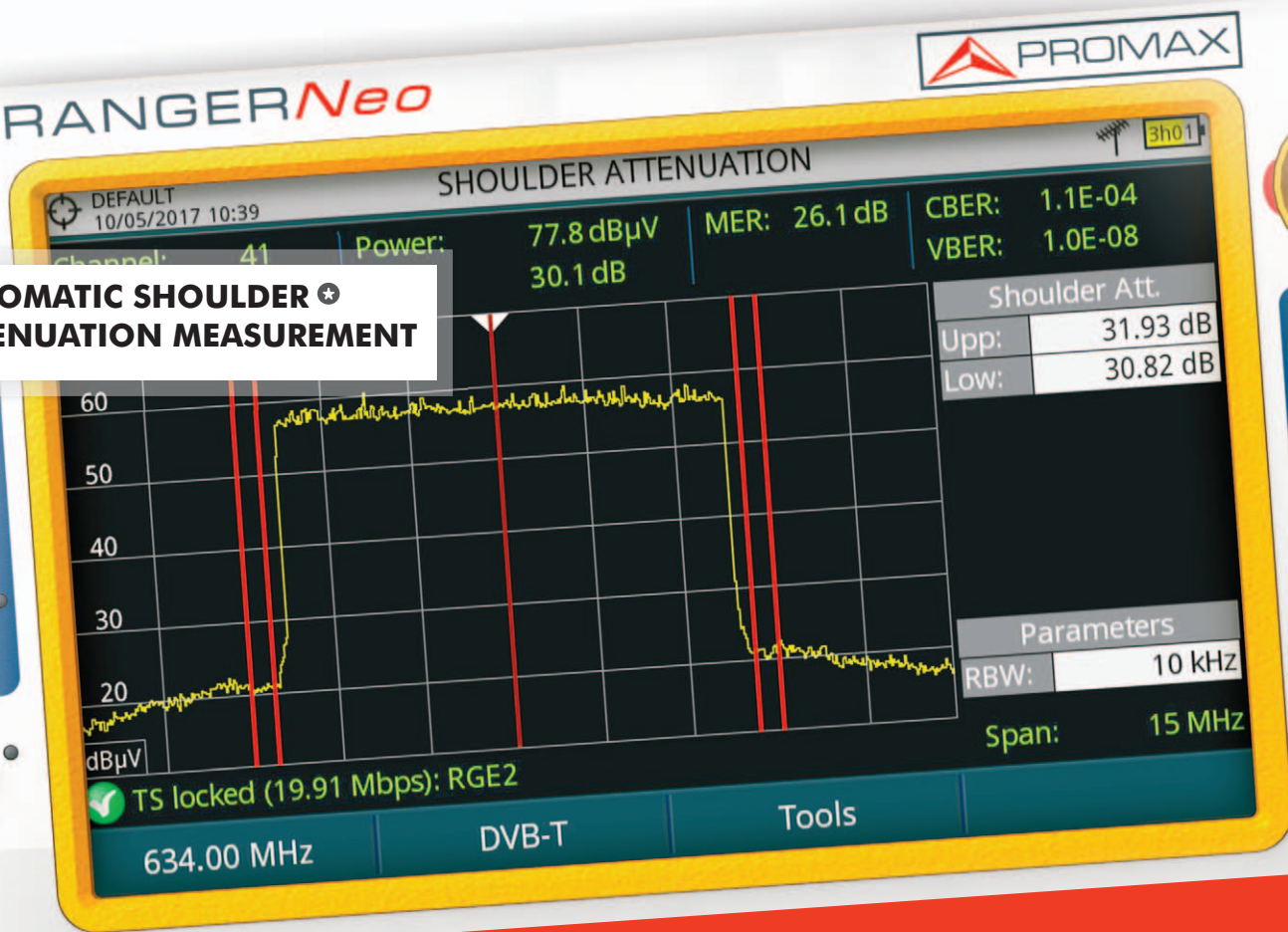


Record, analyze, decode and copy a Transport stream ★

A function available for **RANGERNeo** 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.

RANGERNeo

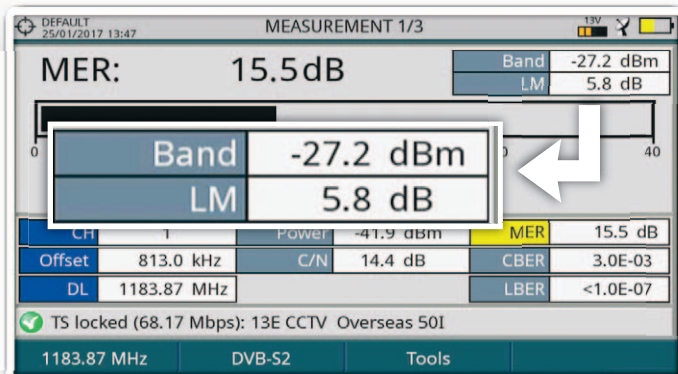
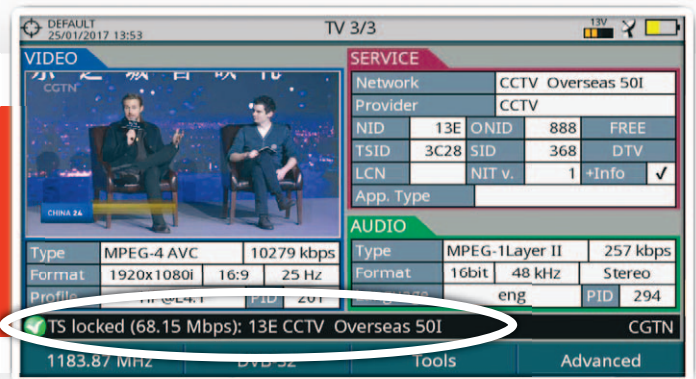
AUTOMATIC SHOULDER ATTENUATION MEASUREMENT



Productivity tools

StealthID

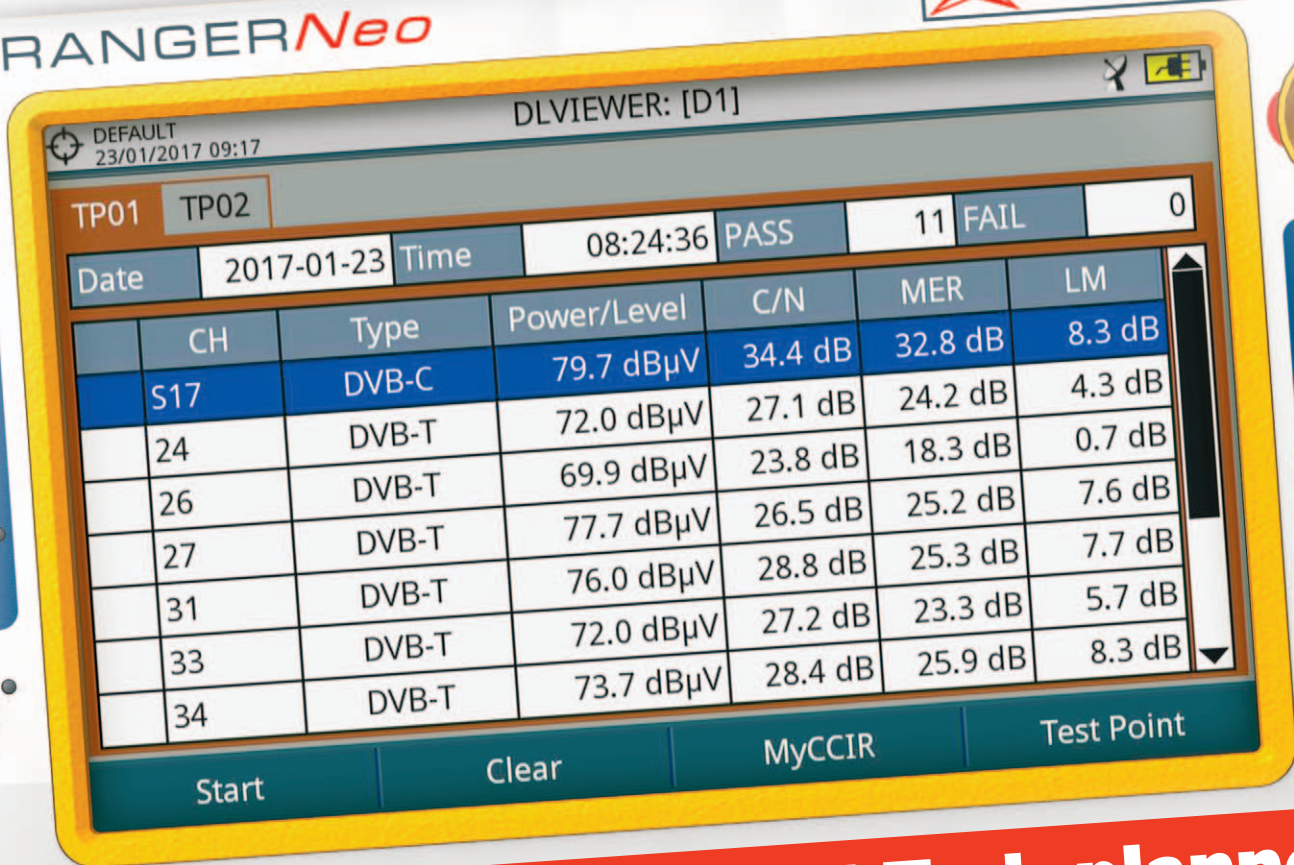
The **RANGERNeo** StealthID function automatically identifies the required demodulation settings while tuning so that you don't need any previous information about the signal.



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.

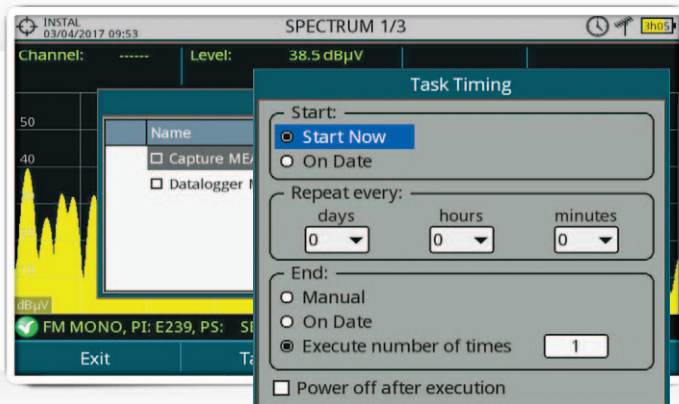
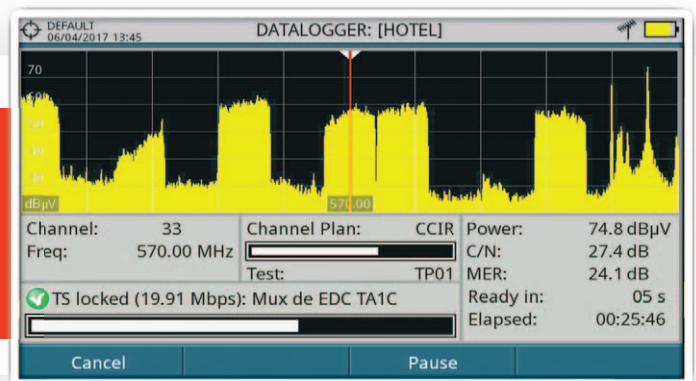
RANGER*Neo*

Powerful datalogger and Task planner

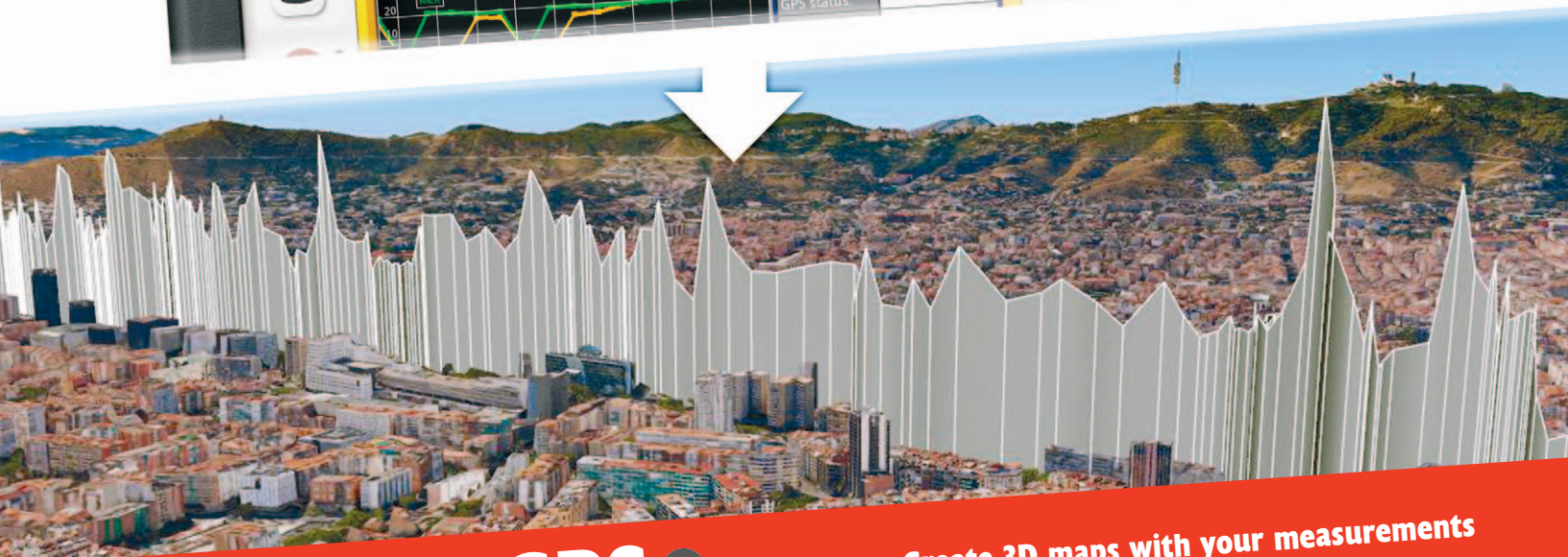
Datalogger and Test&Go

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.

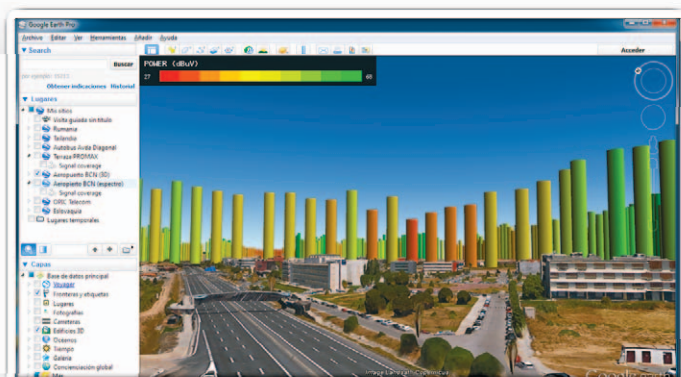
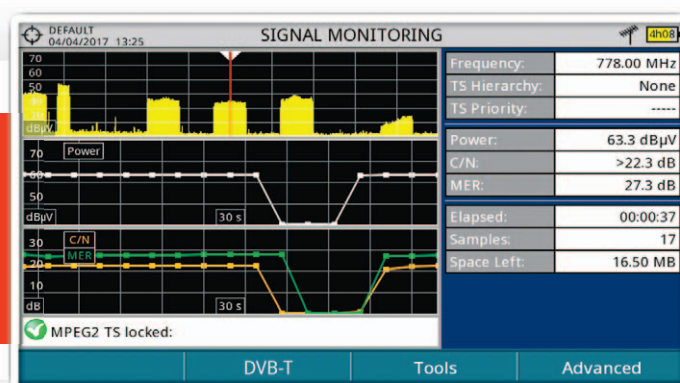


Drive test GPS ★

Create 3D maps with your measurements

Coverage analysis and GPS

This option turns the **RANGERNeo** 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 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.

FREE
ONLINE TOOL
TO GENERATE
KML FILES



Google Earth



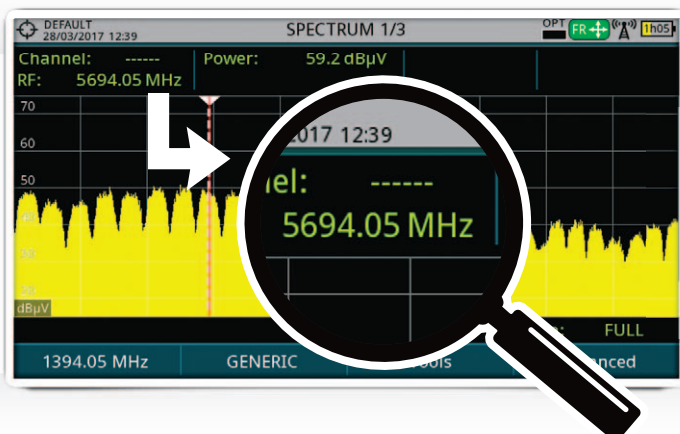
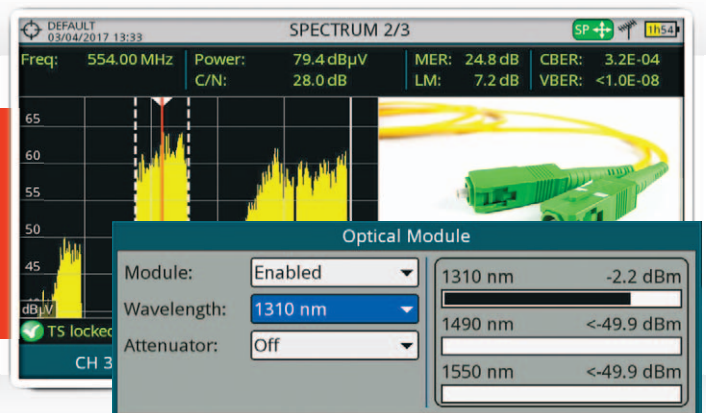


Optical measurements ★

... 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 **RANGERNeo** 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

RANGER Neo



OTT MEASUREMENTS

DEFAULT
30/03/2017 20:24

URL http://demo.unified-streaming.com/video/machete/machete.ism/machete.mpd?f...

Tests messages

OK

GET (#44) http://demo.unified-streaming.com/video/machete/machete.ism/dash/...

OK

GET (#45) http://demo.unified-streaming.com/video/machete/machete.ism/dash/...

OK

GET (#46) http://demo.unified-streaming.com/video/machete/machete.ism/dash/...

OK

Test finished

MPEG-DASH

URL

Page Up

Page

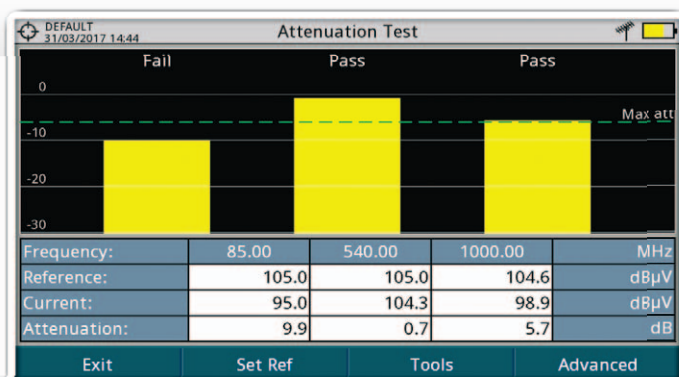
OTT. MPEG-DASH AND HLS VIDEO STREAMING

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

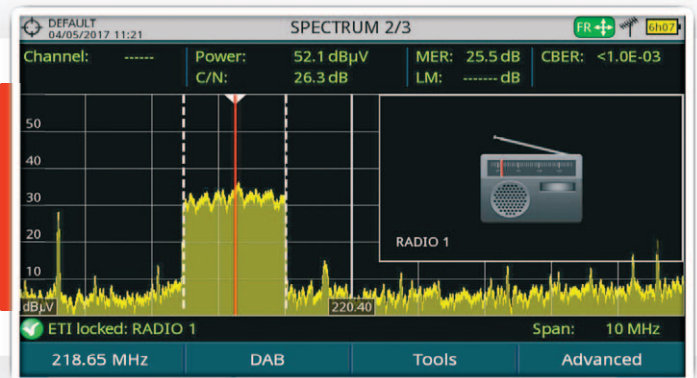
Test the frequency response of your installation using RP-050, RP-080, RP-110B signal generators.



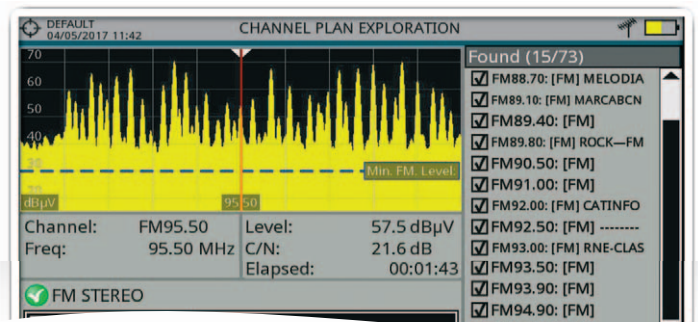
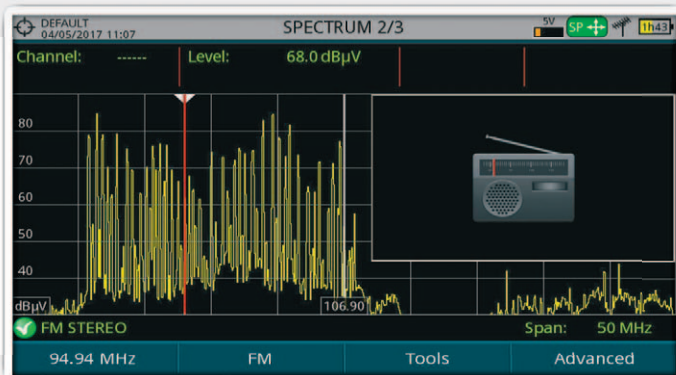
FM, RDS and DAB+ radio ★

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. **RANGERNeo** DAB option is compatible with both standards.



FM radio receiver and analyzer

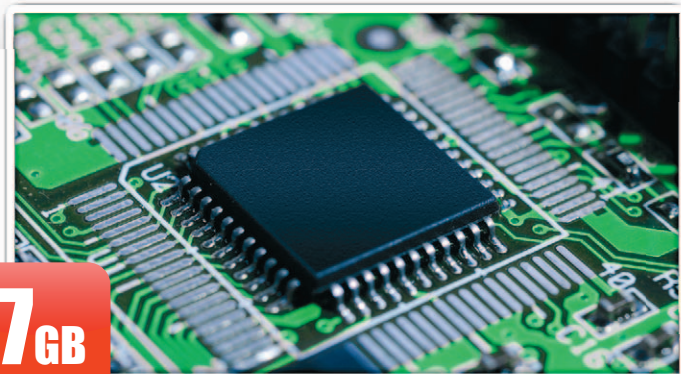




Remote monitoring & Web server ★

Ethernet connectivity

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



7GB

More internal memory: Up to 7 GB

There is more data a **RANGERNeO** 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 **RANGERNeO** are far from negligible.



Field strength measurements

The **RANGERNeo** 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.



Extended connectivity features

Transport stream input and output

RANGERNeo 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 input

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

RANGERNeo 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.

SPECIFICATIONS	RANGERNeo Lite	RANGERNeo +	RANGERNeo 2	RANGERNeo 3
DIGITAL BROADCAST STANDARDS	DVB-T, DVB-T2, DVB-T2 lite DVB-C, DVB-C2 DVB-S, DVB-S2 DVB-S2 Multistream DSS, ACM / VCM / CCM	Same as RANGERNeo Lite, plus: DAB, DAB+ (optional)	Same as RANGERNeo +, plus: MPEG-TS	Same as RANGERNeo 2, plus: 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 input for remote control - Analogue Video/Audio input - 2xUSB (Type-A) for data transferring	Same as RANGERNeo Lite	Same as RANGERNeo +, plus: - ASI-TS input and output (BNC Female, 75 Ω) - IPTV multicast input (UDP / RTP, RJ45) - Common Interface slot	Same as RANGERNeo 2, plus: - 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) - MAX and MIN hold - FM RDS radio meas. and decoding - Screenshots and Datalogger for meas.reports - Beacon-Flyaways SNG and VSAT - Wideband LNB - WiFi 2.4 GHz - LTE 1.8 GHz - OTT - Service Recording - Field strength measurement - Task planner	Same as RANGERNeo Lite, plus: - Merogram - Spectrogram - Signal monitoring - Remote control (webserver) - MER by carrier - GPS coverage analysis (optional)	Same as RANGERNeo +, plus: - TS recording - TS analysis - IPTV multicast measurement and decoding - Shoulder attenuation	Same as RANGERNeo 2, plus: - Network delay - DVB-T2-MI analysis
SPECTRUM ANALYZER Frequency Margin Measurement range Span Resolution bandwidths	From 5 - 1000 MHz (Terrestrial) From 250 - 2500 MHz (Satellite) From 10 - 130 dB μ V Full / 500 / 200 / 100 / 50 / 20 / 10 MHz			
	100 kHz	100, 200 kHz 1 MHz	2 kHz (terrestrial) 10, 20, 40, 100, 200 kHz 1 MHz	2 kHz (terrestrial) 10, 20, 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 analogue TV FM radio DVB-S QPSK DVB-S2 QPSK, 8PSK, 16APSK, 32APSK DSS QPSK	From 5 - 1000 MHz (Terrestrial) From 250 - 2350 MHz (Satellite) Power (35 to 115 dB μ V), CBER, VBER, MER, C/N, Link margin Power (35 to 115 dB μ V), CBER, C/N, LBER, MER, Link Margin, BCH ESR, LDP iterations, Wrong packets Power (45 to 115 dB μ V), BER, MER, C/N, Link margin Power (45 to 115 dB μ V), 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 dB μ V), CBER, MER, C/N, Link Margin Power (35 to 115 dB μ V), CBER, LBER, MER, C/N, BCH ESR, Wrong packets, Link Margin Power (35 to 115 dB μ V), 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)	> 4 h (smart battery)	> 4 h (smart battery)
HARD CASE	Optional	Included	Included	Included

OPTIONS	RANGERNeo +	RANGERNeo 2	RANGERNeo 3
DAB, DAB+	Available	Available	Included
GPS Coverage Analysis	Available	Available	Included
Rack assembly	Available	Available	Available
OPM + Optical-to-RF converter + WiFi 5 GHz + LTE 2.6 GHz + 6 GHz RF input	Available	Available	Available
WiFi 5 GHz + LTE 2.6 GHz + 6 GHz RF input	Available	Available	Available

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 3



RANGER
Neo 2



RANGER
Neo +



RANGER
Neo Lite



HD RANGER
UltraLite



HD RANGER
Eco

HEVC H.265 decod. + 4K Frame Grabber	✓	✓	✓	✓		
MPEG-2 and MPEG-4 H.264 decoding	✓	✓	✓	✓	✓	✓
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	1x Mini USB	1x Mini USB
Battery time	> 4 hours	> 4 hours	> 4 hours	> 2 hours	> 2 hours	> 2 hours
Resolution filter 100 kHz	✓	✓	✓	✓	✓	✓
Resolution filter 200 kHz, 1 MHz	✓	✓	✓		✓	
Resolution filter 2, 10, 20, 40 kHz	✓	✓				
Echoes analysis	✓	✓	✓	✓	✓	✓
Constellation diagram	✓	✓	✓	✓	✓	✓
Web server	✓	✓	✓			
Spectrogram	✓	✓	✓			
MER by carrier	✓	✓	✓			
Merogram	✓	✓	✓			
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 RFin	○	○	○			
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		✓				