



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

# TV & SPECTRUM ANALYZERS

[www.promaxelectronics.com](http://www.promaxelectronics.com)



# RANGER*Neo* ATSC



## HEVC H.265 decoding

High efficiency Video Codec

RANGER*Neo* ATSC is the new industry standard in field strength meters, TV and spectrum analyzers. It covers from 5 to 2500 MHz and it includes HEVC decoding.



ULTRA FAST SPECTRUM



TRIPLE SPLIT DISPLAY



LIGHT WEIGHT (< 5 pounds)

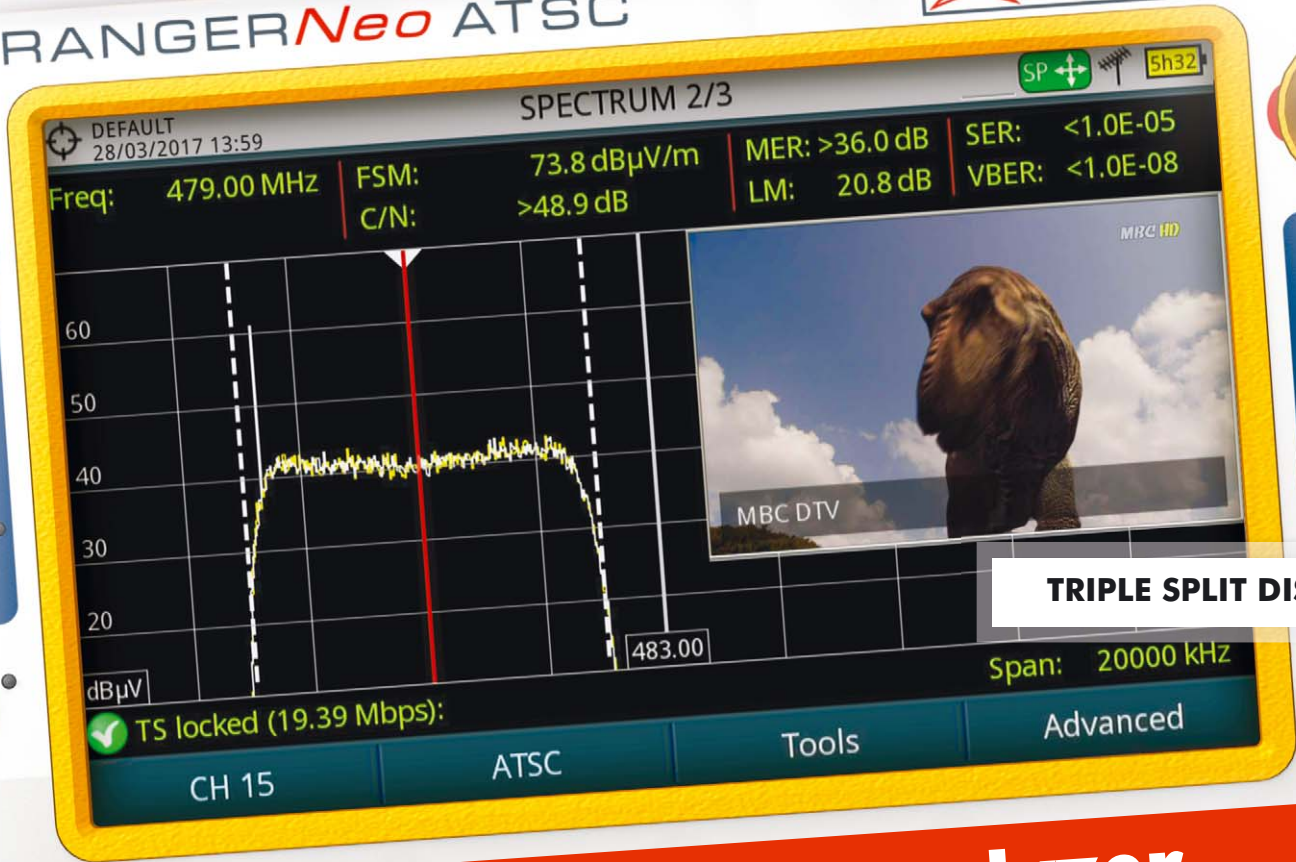


SMART BATTERY CONTROL





# RANGER Neo ATSC

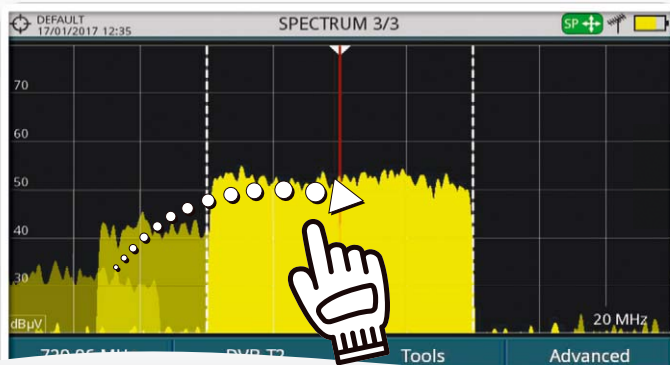


TRIPLE SPLIT DISPLAY

## Professional spectrum analyzer

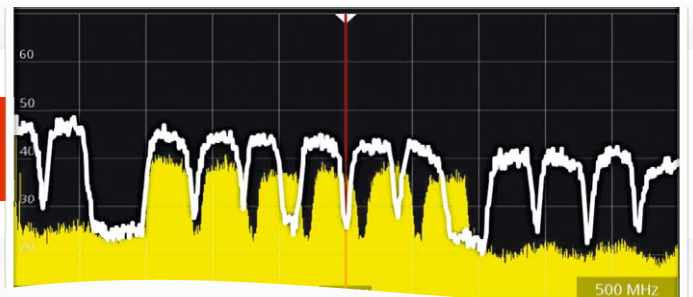
### Reference traces

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



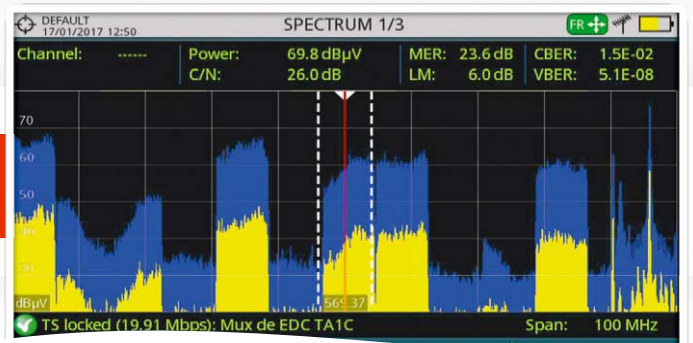
### MIN and MAX hold

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

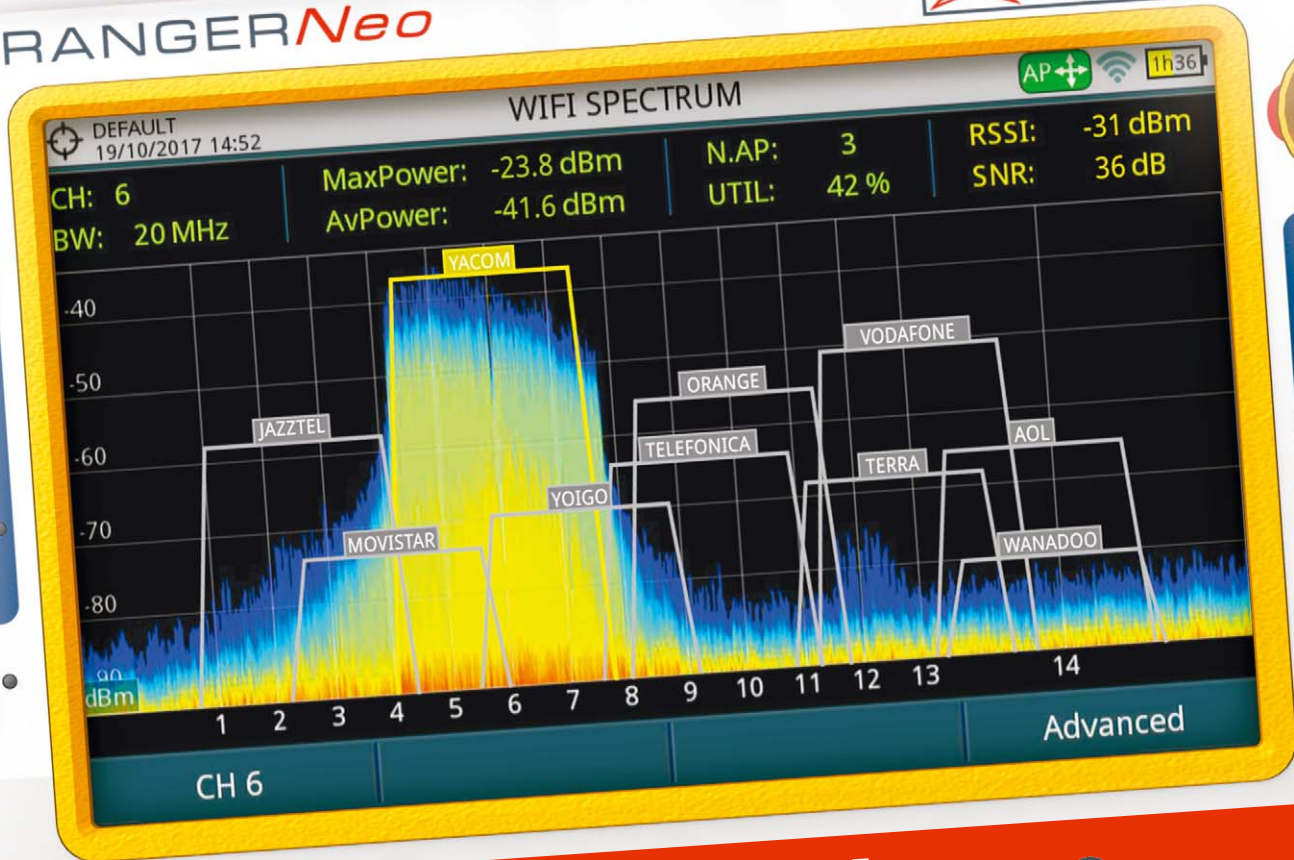


### Touch screen

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



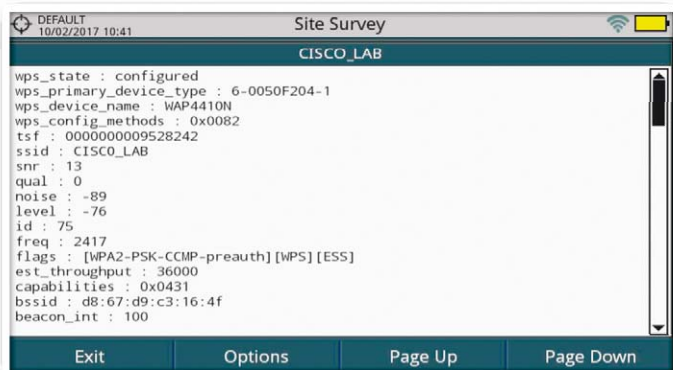
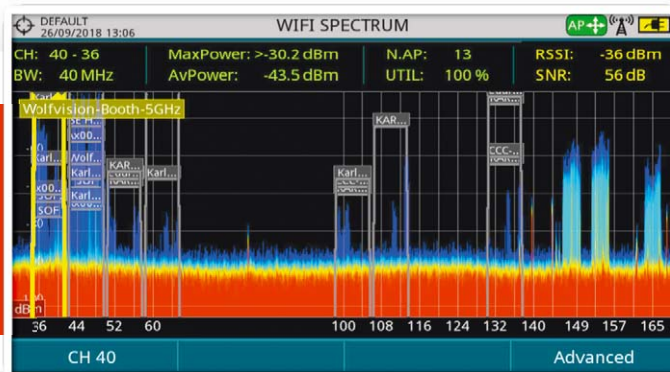
# RANGER*Neo*



## 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

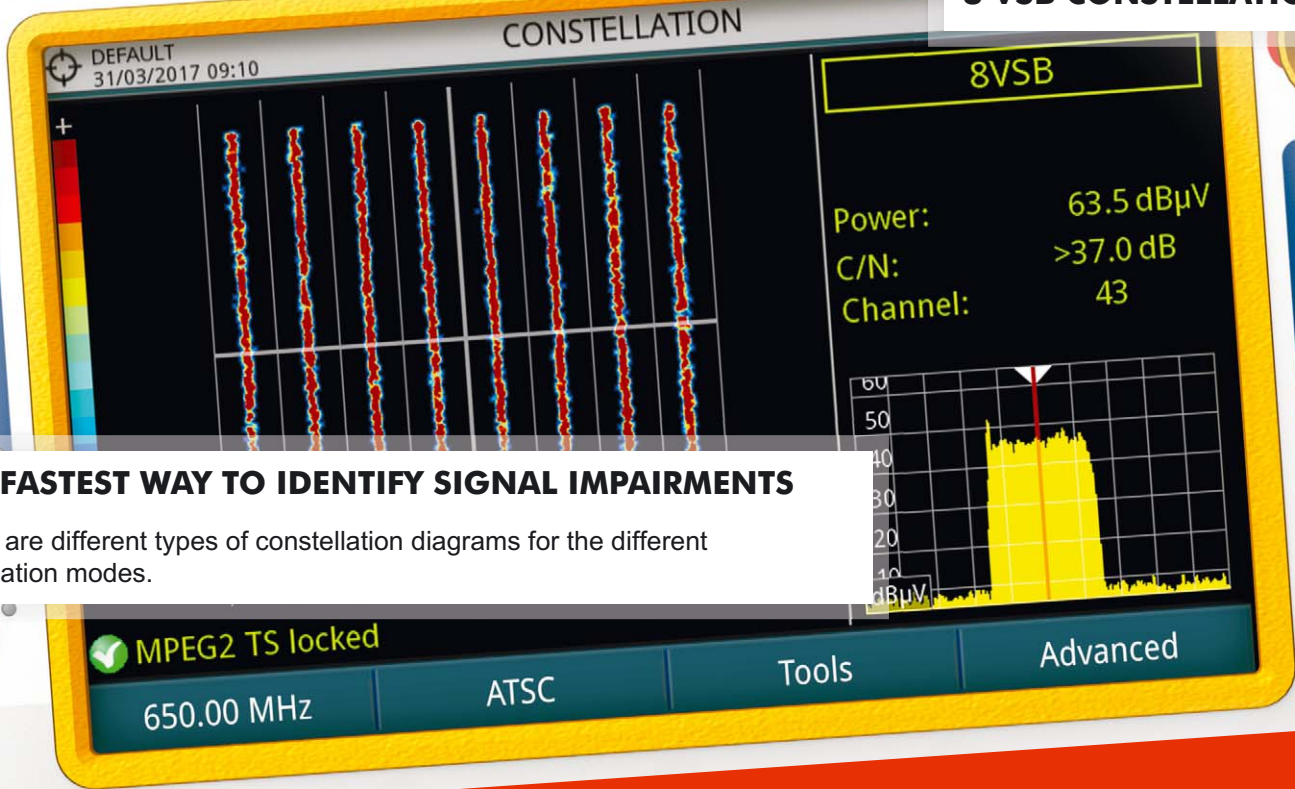
**RANGER*Neo* ATSC** shows convenient information from the access points such as SSID, RSSI, SNR, security information, etc. It also indicates the number of access points per channel and offers you guidance regarding the level of occupancy of a specific channel.





# RANGER<sup>Neo</sup> ATSC

## 8 VSB CONSTELLATION



### THE FASTEST WAY TO IDENTIFY SIGNAL IMPAIRMENTS

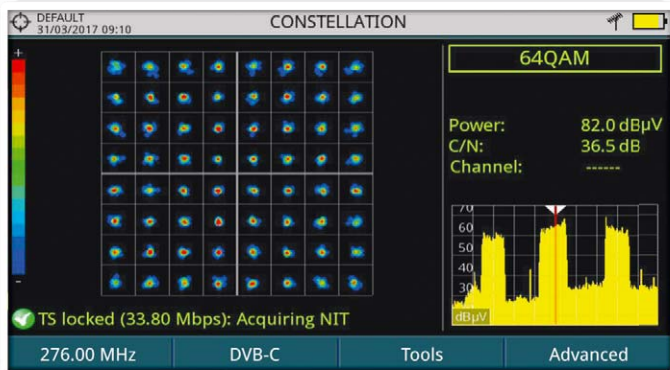
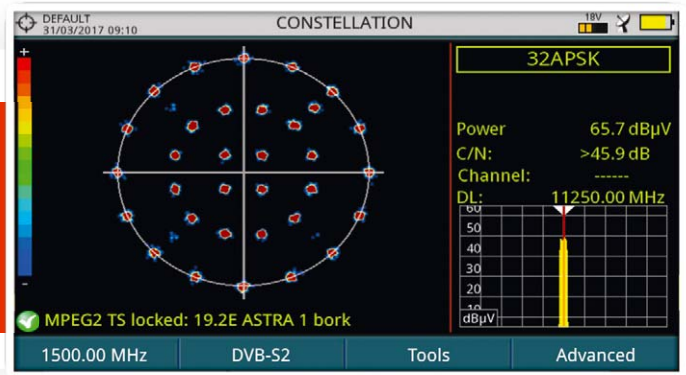
There are different types of constellation diagrams for the different modulation modes.

# 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

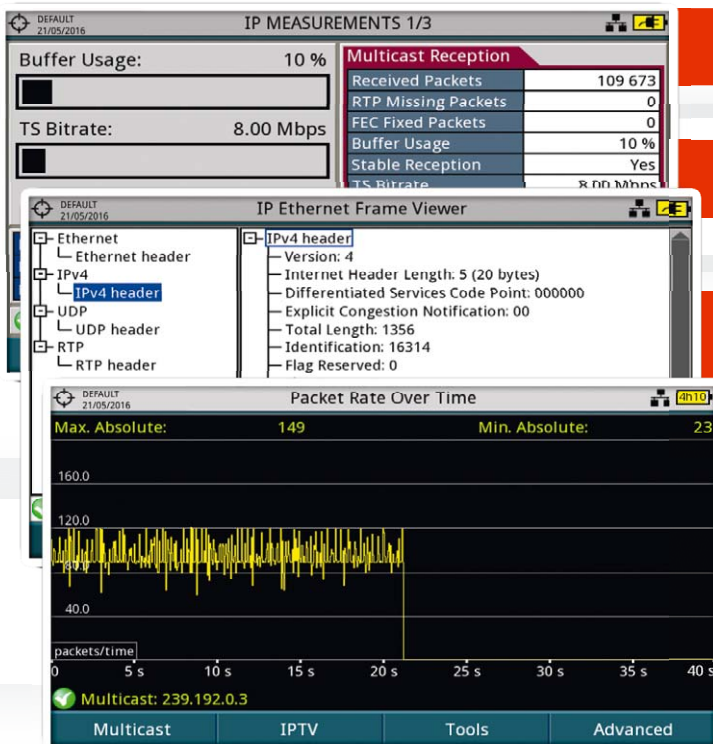
Every modulation type is represented differently. A ITU J.83 Annex B 16QAM signal is represented on the screen by a total of 16 different zones, and a DVB-C 64QAM is represented on the screen by a total of 64 different zones and so on.





## 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

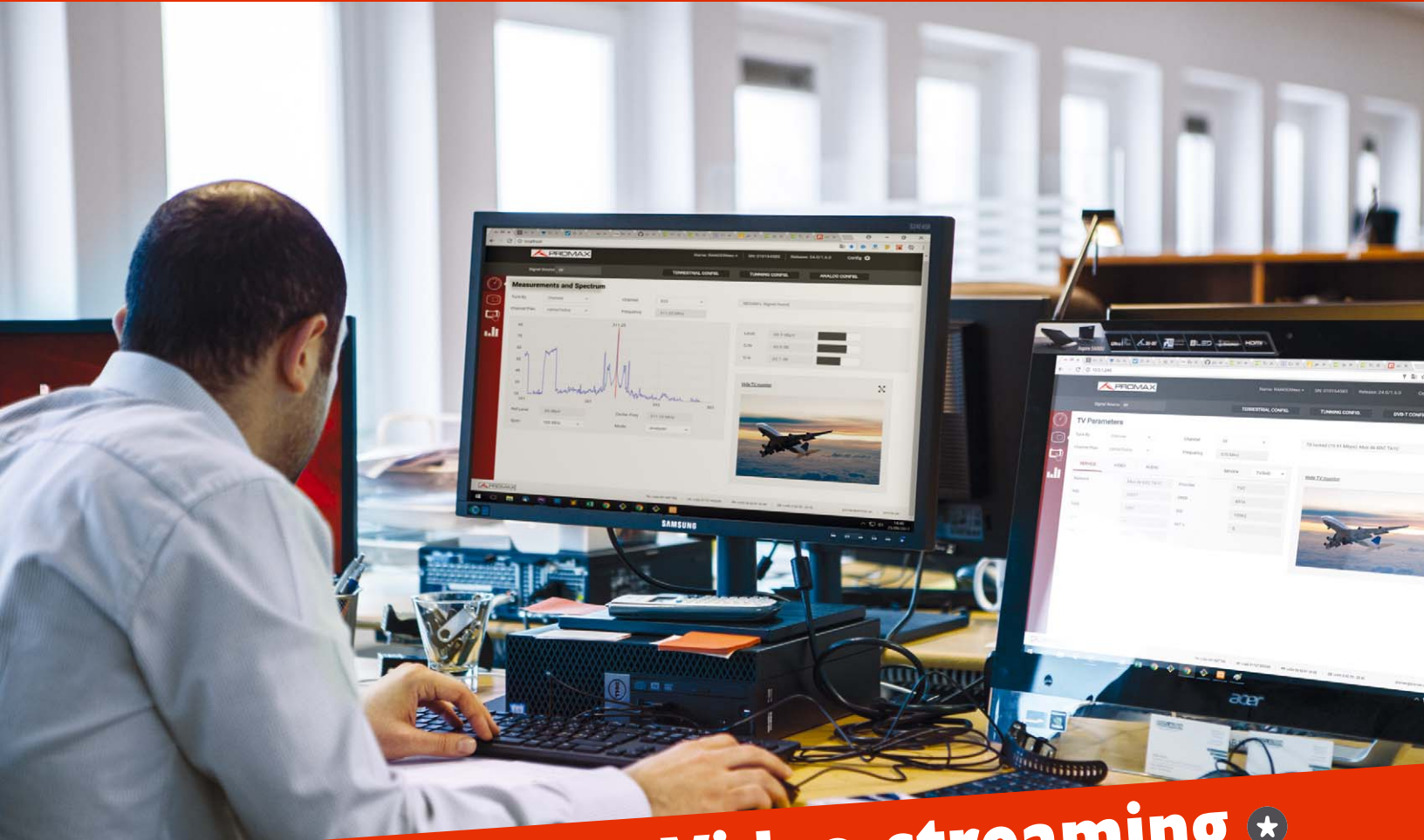
A key quality measurement formed by the Delay Factor and the Media Loss Rate. FEC measurements are also available.

### 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.



# 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...



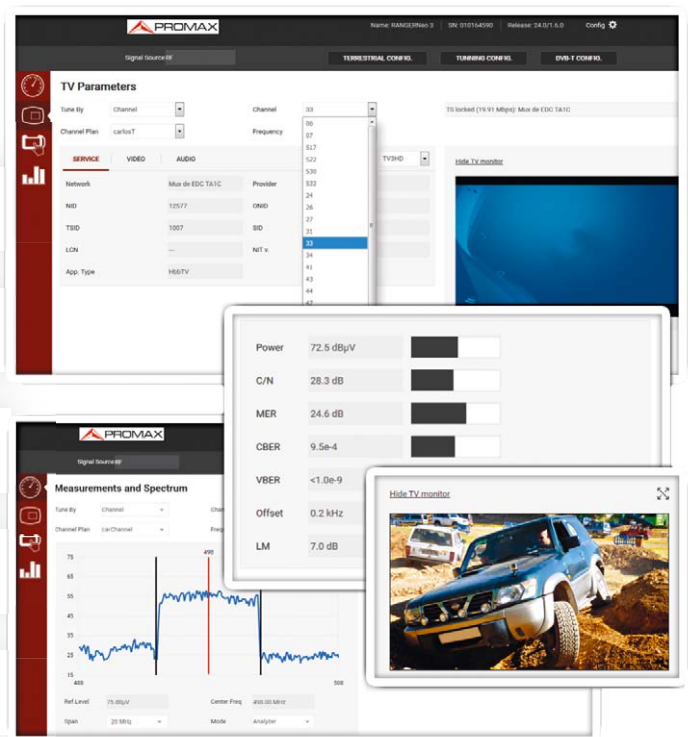
## HISTORICAL MONITORING

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.







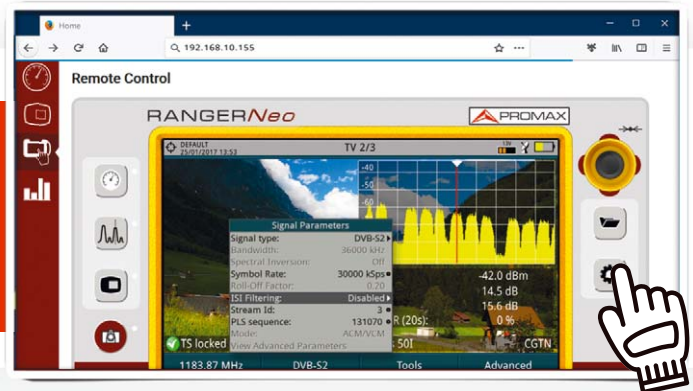
## RANGER<sup>Neo</sup> ATSC MONITORING TOOL: REMOTE SIGNAL QUALITY SUPERVISION

### Alarms

Channels	Date & Hour	Description
53	2017/10/17 8:20:00	POWER (52) > 50
53   BASE	2017/10/18 7:53:00	PLP (101) Not found
53   BASE   100	2017/10/17 8:24:00	MER (35) < 40

## RANGER<sup>Neo</sup> Console

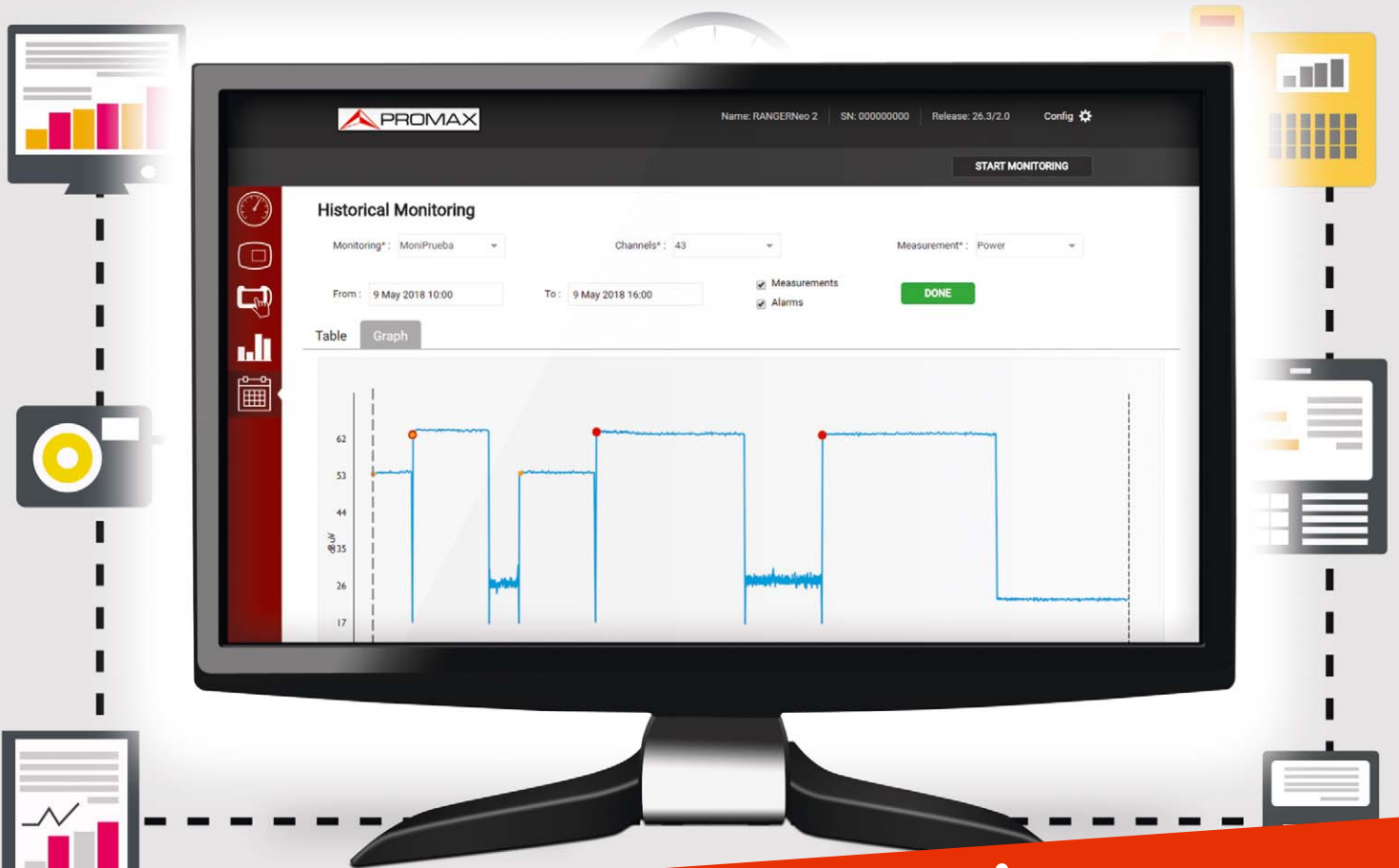
Complete control over your field strength meter from anywhere in the world and with no additional software installation required. A virtual platform that gives you access to all of the analyzer features.



## 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.

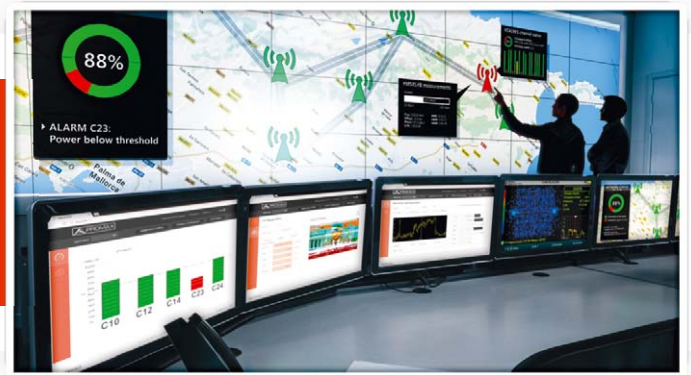
The same feature can be used for other streams received over IP or previously recorded, instead of coming from an RF source.



## 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.



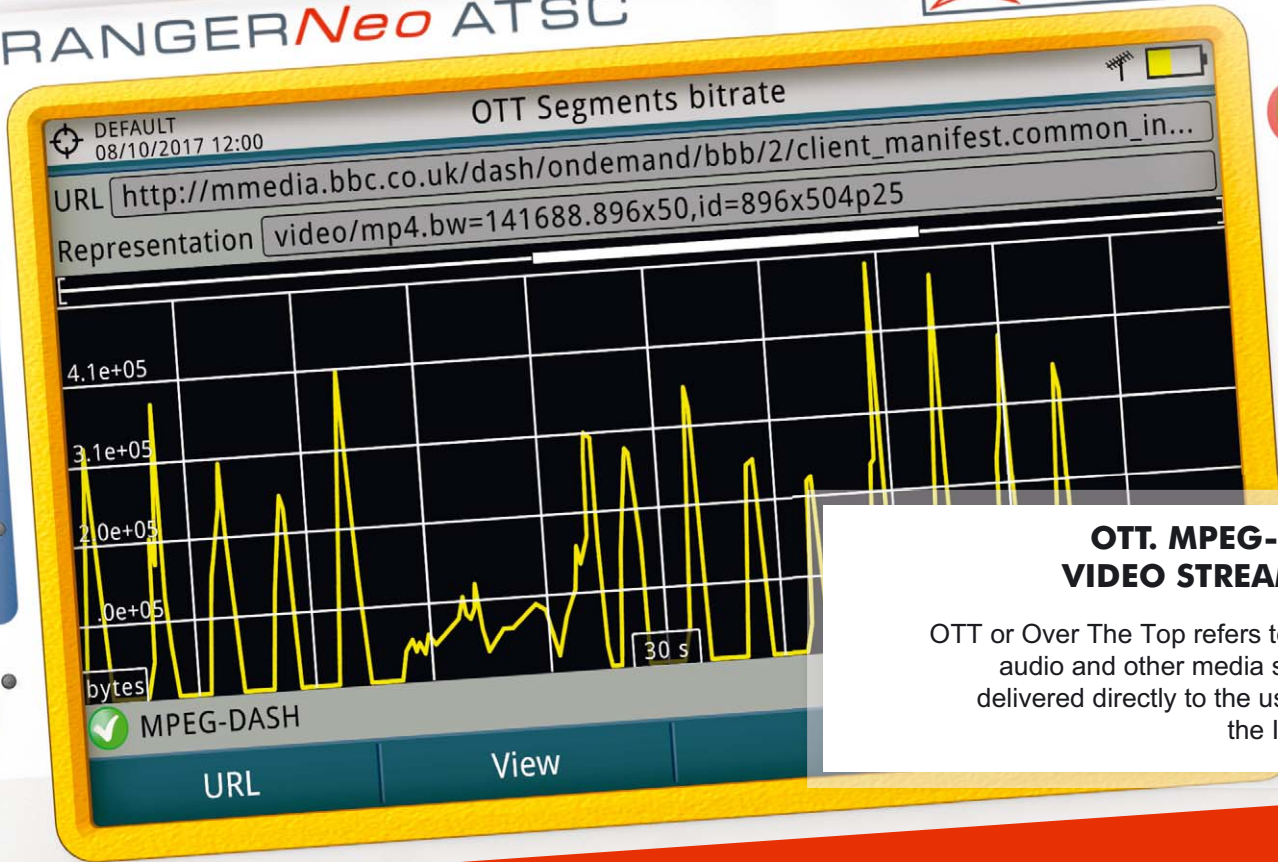
### Professional monitoring system

**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.



# RANGER*Neo* ATSC



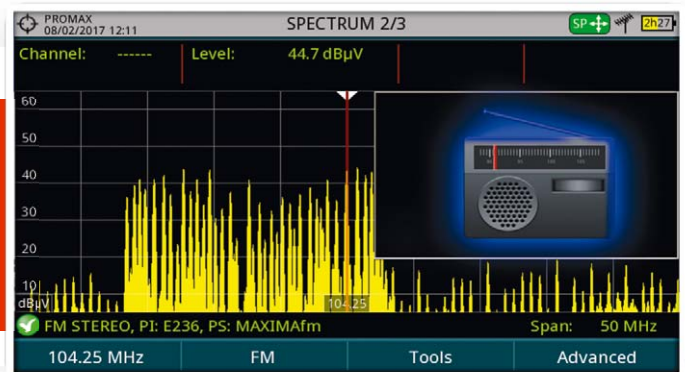
## OTT. MPEG-DASH VIDEO STREAMING

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.



**19" RACK**  
VERSION  
AVAILABLE

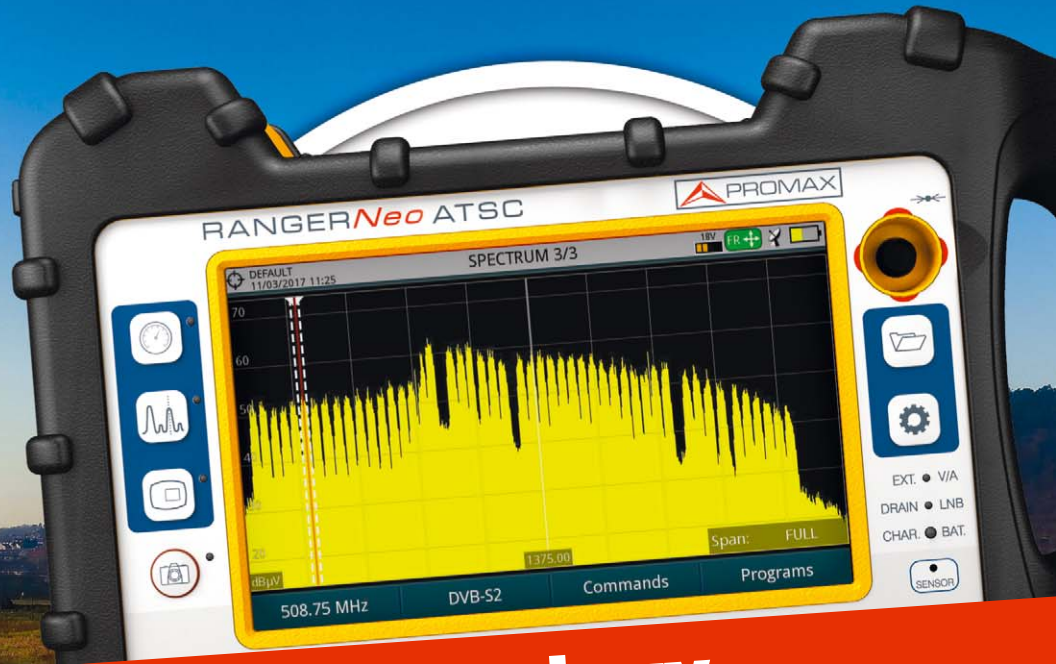


### Field strength measurements

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

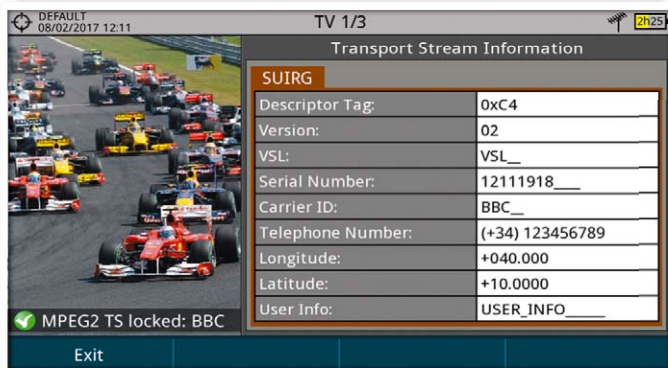
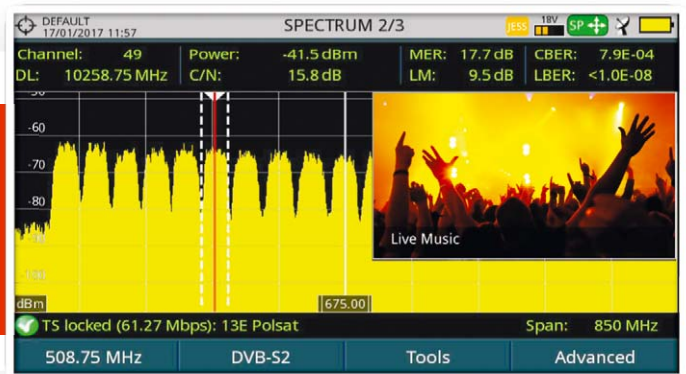
Wideband LNBs deliver the entire vertical and horizontal satellite polarities (low and high band together) using two separate RF cables and an extended IF frequency range from 290 to 2,340 MHz. **Is your analyzer ready?**



# 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 **RANGERNeo 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 troubleshooting of interferences in scenarios such as live transmissions of sports events.

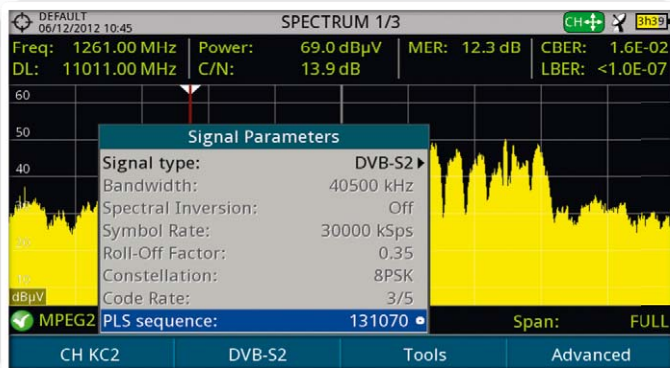
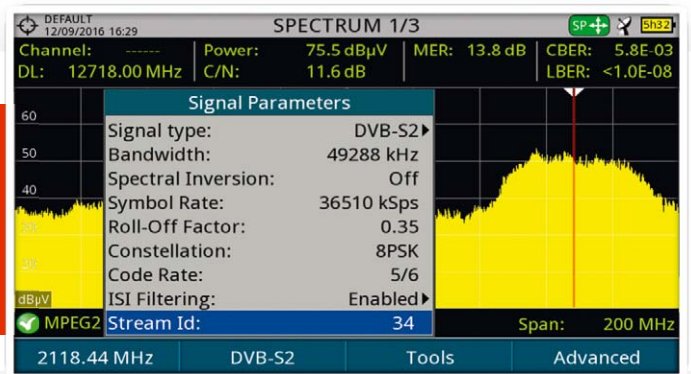




# Multistream and PLS

## DVB-S2 multistream

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



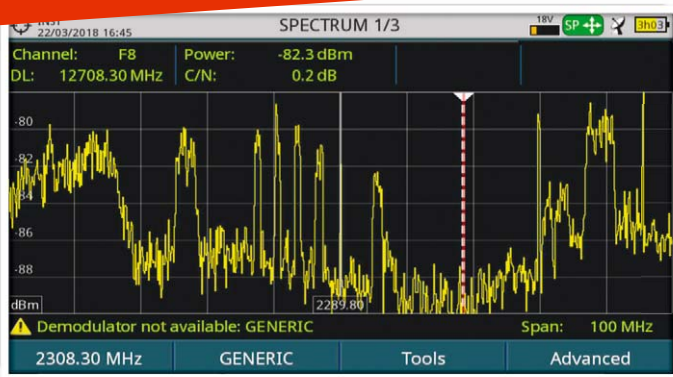
## PLS - Physical Layer Scrambling

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



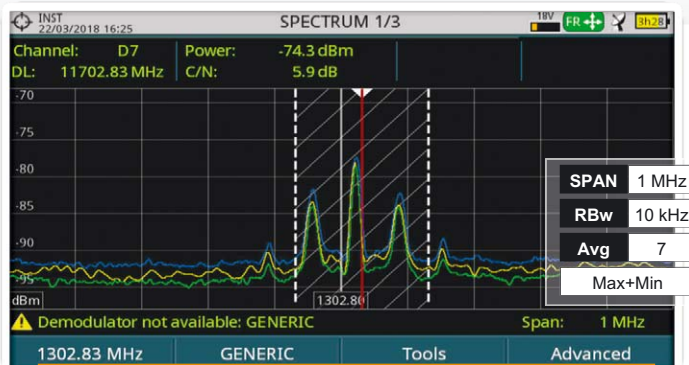


# Advanced satellite technology

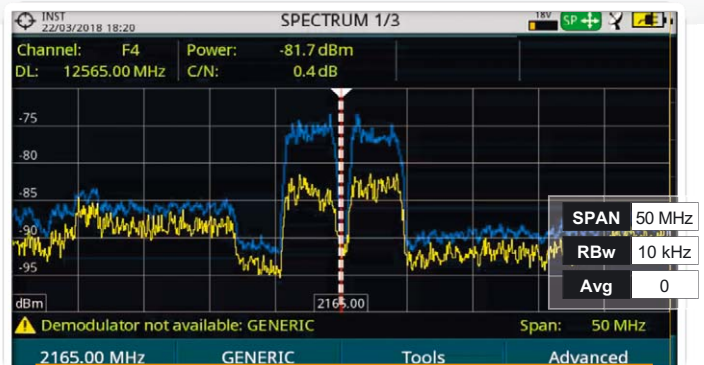


## L-band spectrum analyzer

**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





## 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



# RANGER<sup>Neo</sup> 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** **ATSC**

Versions



**RANGER Neo +**

Web Server remote control

Merogram and Spectrogram

Fibre optics  
and GPS options

More than 4 hours battery time

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

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**

WiFi analyzer



PSIP analysis and CC closed caption



Transport stream recorder and analyzer



webControl  
via Ethernet port

**DAB+**

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 ISDB-T ATSC** versions



**RANGER Neo 3**



Network Delay Margin (DVB)

T2-MI analysis

GPS for drive test measurements

DAB/DAB+ digital radio

**DVB ISDB-T** version



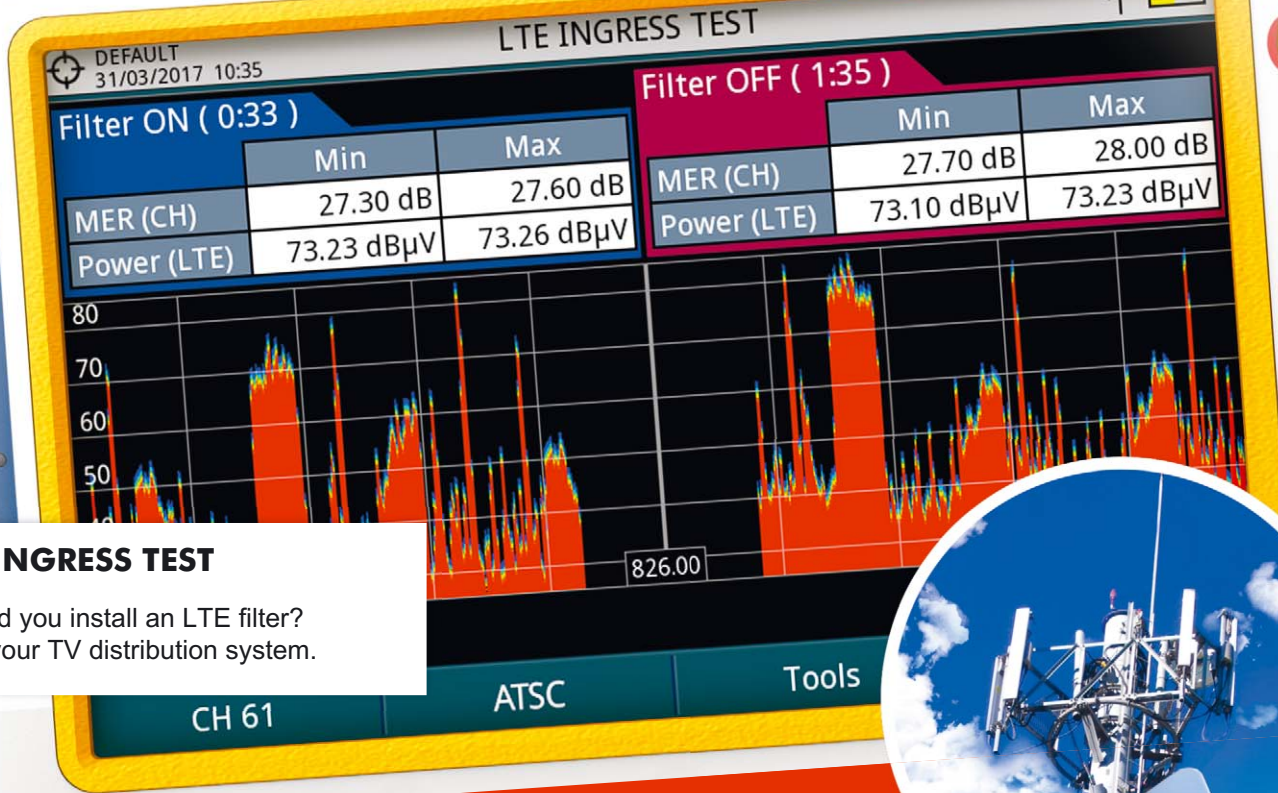
**RANGER Neo 4**



4K decoder

**DVB ISDB-T** version

# RANGER*Neo* ATSC



## 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 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.



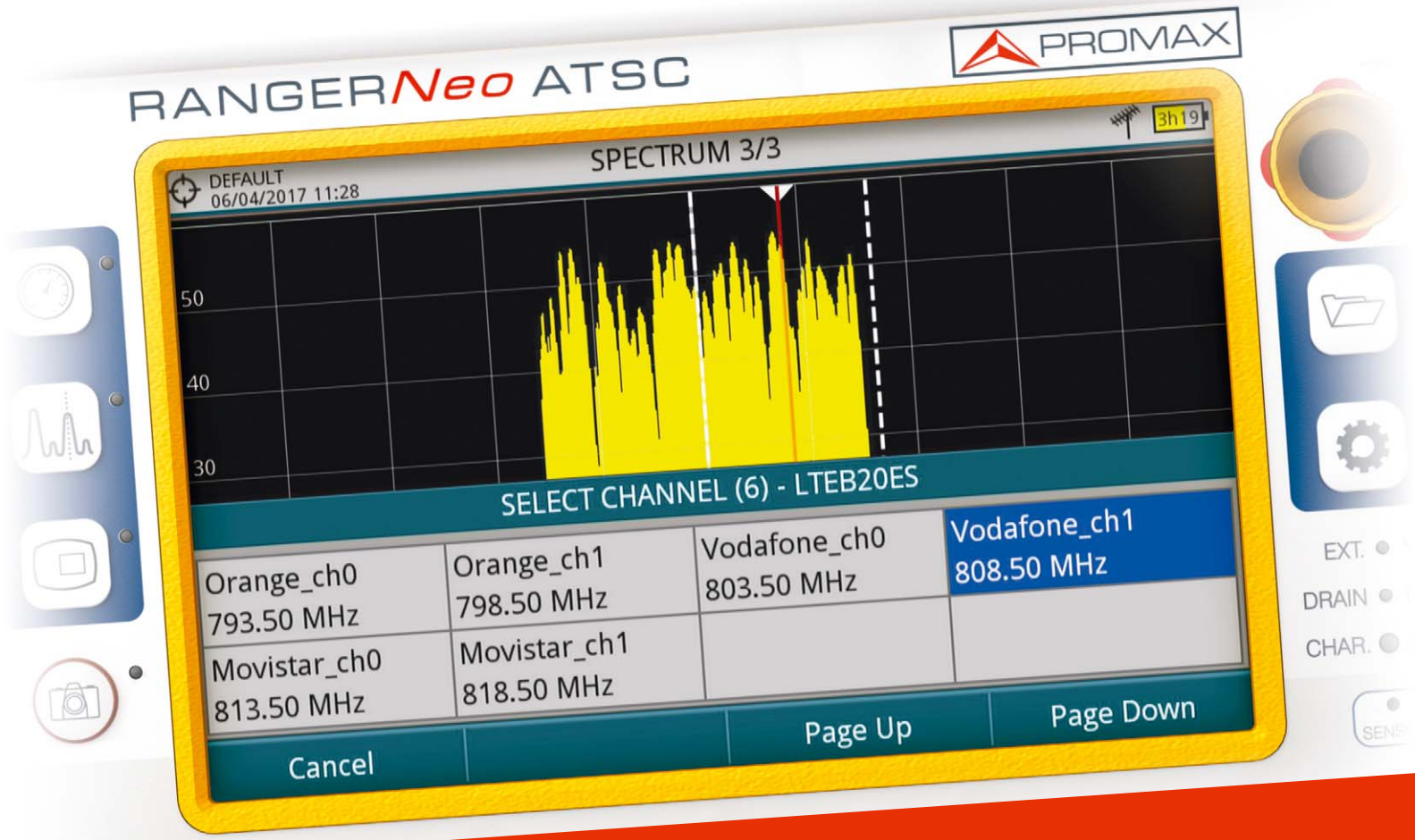
## LTE interference on CATV networks

Some of the bands allocated to LTE are near or inside former television bands. For example band 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.

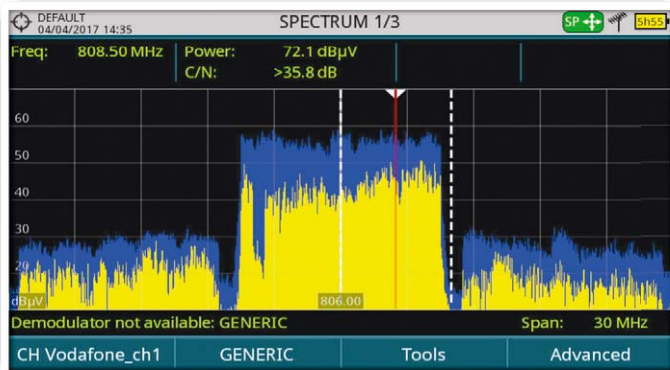




# LTE Signals

## LTE signals and channel repack

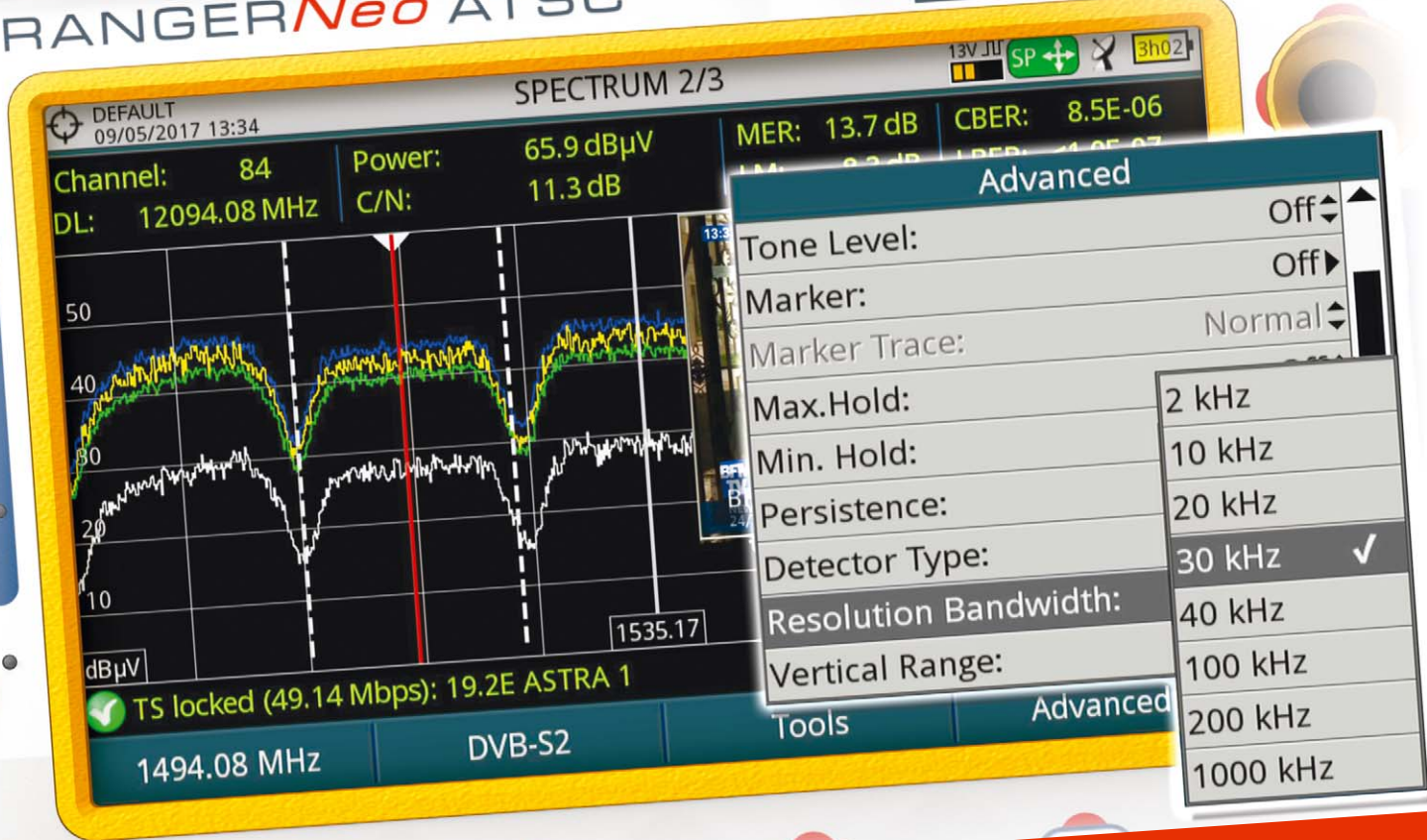
The use of Smartphones is widely spread all over the world. In order to meet user demand for bandwidth, mobile phone operators need to expand their networks, use more efficient transmission standards (LTE) and use part of the bandwidth historically assigned to TV broadcast services (channel repack in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

# RANGER*Neo* ATSC

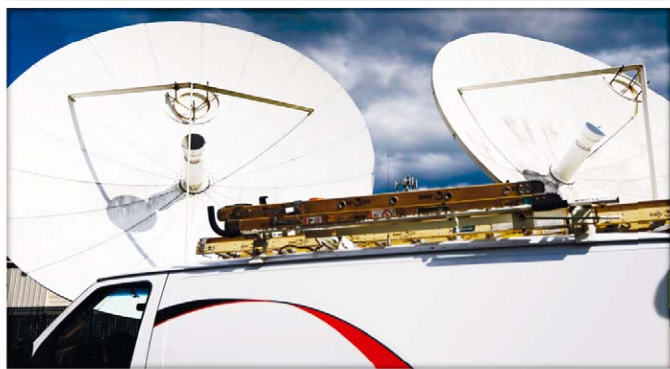
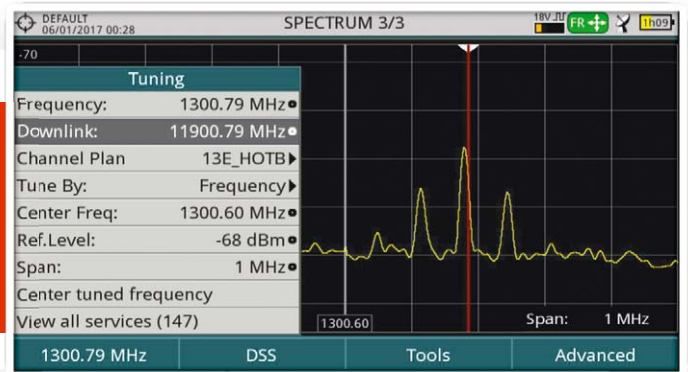


## High resolution filters ★

### 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.

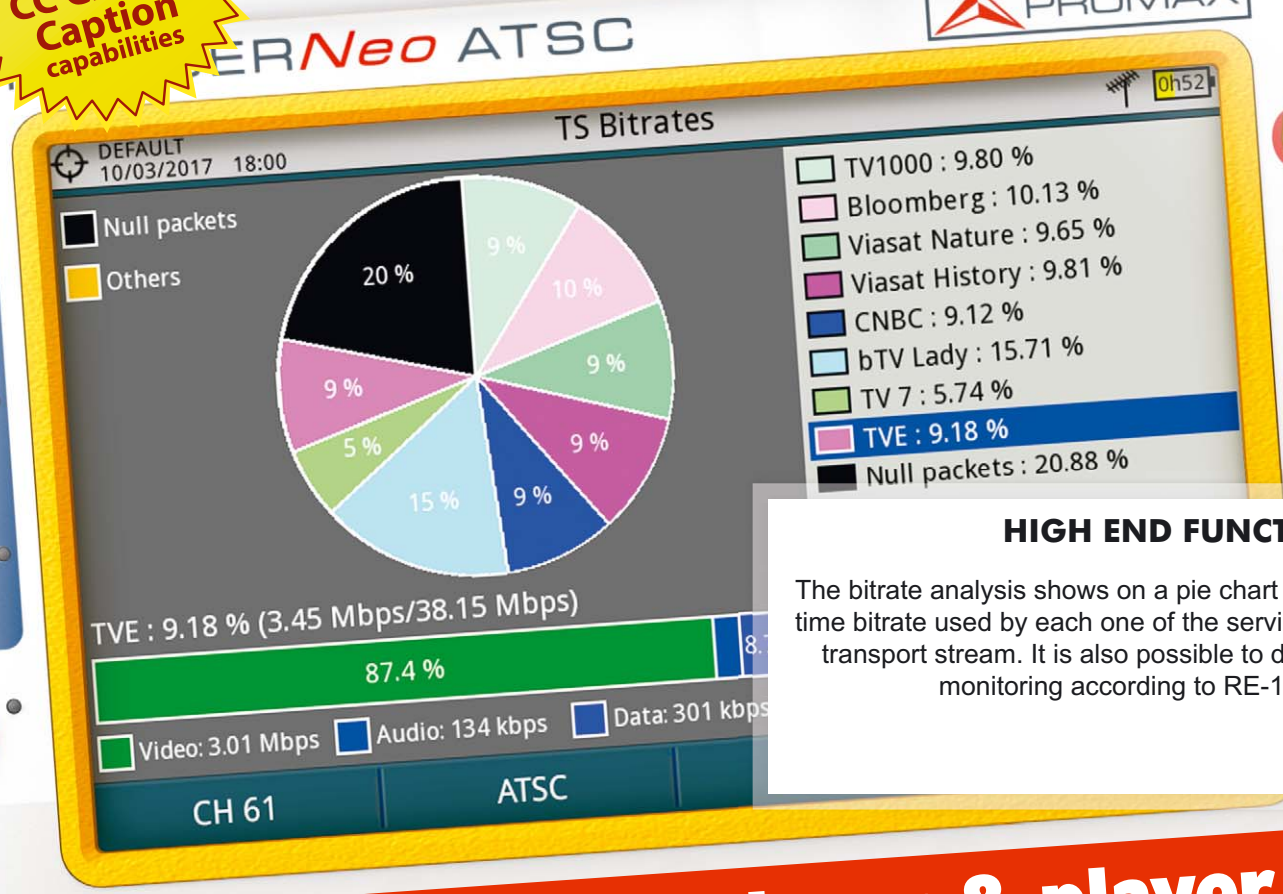


### Helping live broadcast in remote areas

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



**PSIP analysis and CC Closed Caption capabilities**



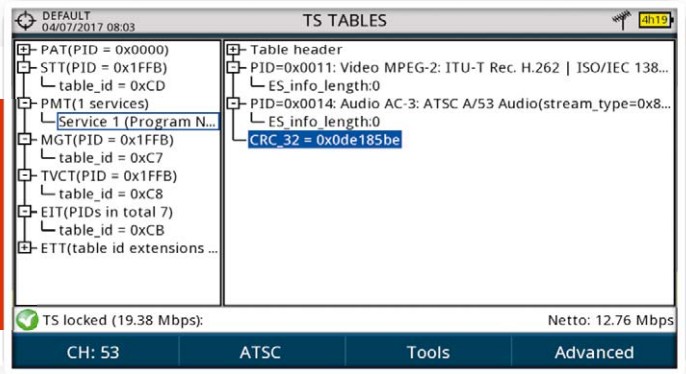
**HIGH END FUNCTIONS**

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 as 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.

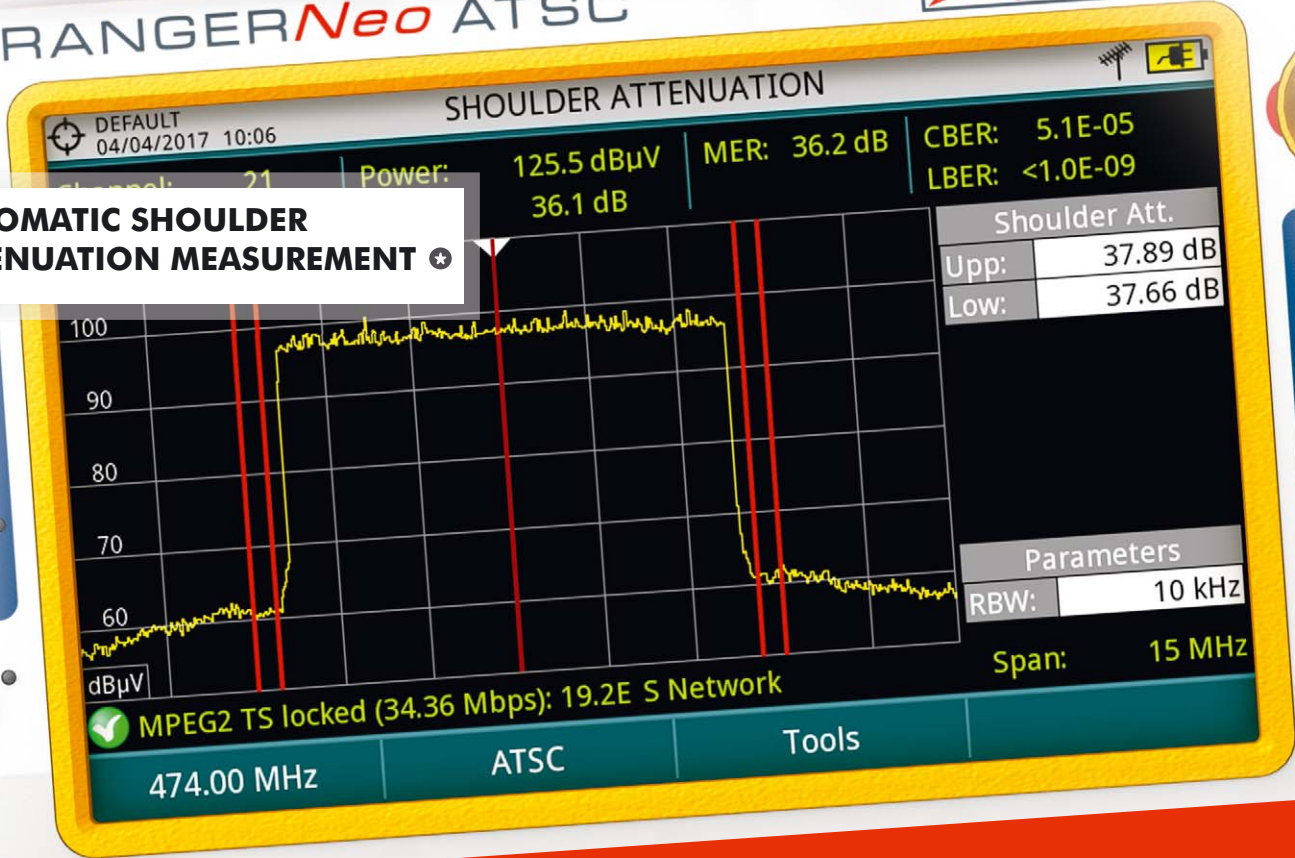


## Record, analyze, decode and copy a Transport stream ★

A function available for RANGERNeo 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.

# RANGER<sup>Neo</sup> ATSC

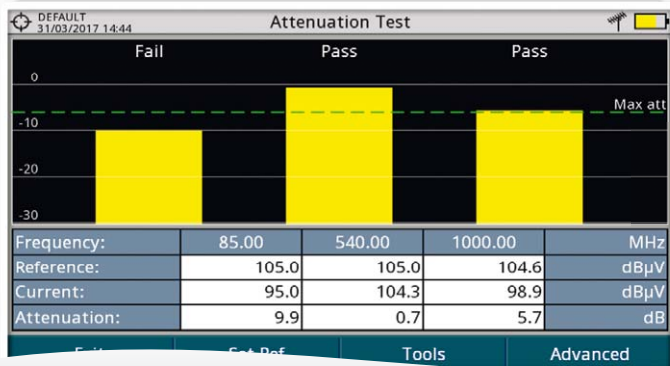
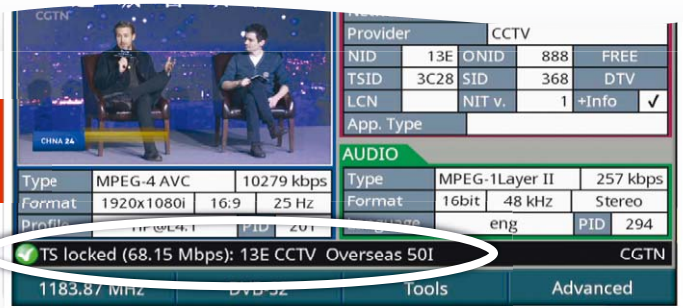
## AUTOMATIC SHOULDER ATTENUATION MEASUREMENT



# Productivity tools

## StealthID

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

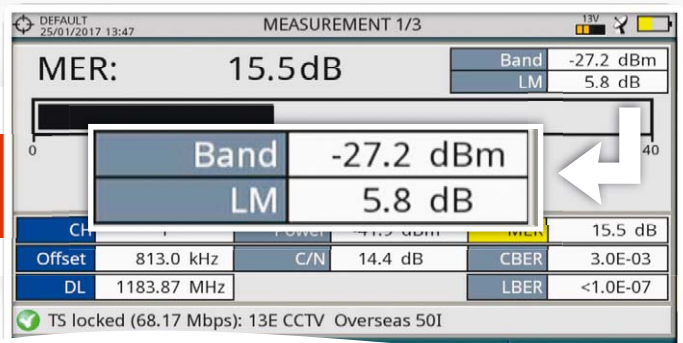


## Attenuation test

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.





# RANGER<sup>Neo</sup> ATSC



DLVIEWER: [MYLOGGER]

INSTAL 03/04/2017 08:58

TP01 TP02

Date: 2017-04-03 Time: 08:54:38 PASS 9 FAIL 0

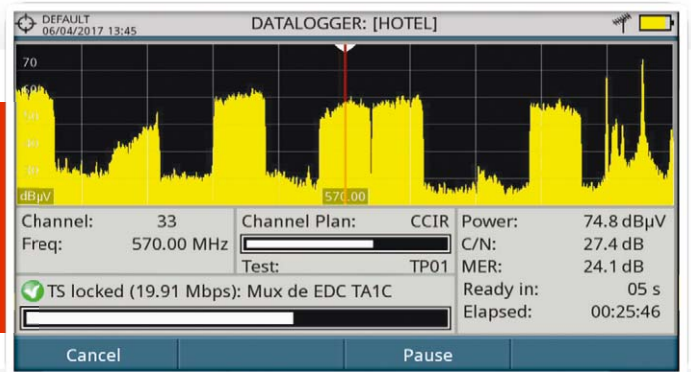
CH	Type	Power/Level	C/N	MER	LM
07	ANALOG	86.5 dBμV	36.2 dB		
21	ATSC	68.5 dBμV	23.0 dB	20.2 dB	2.6 dB
24	ATSC	76.0 dBμV	26.5 dB	24.2 dB	4.3 dB
26	ATSC	74.7 dBμV	25.7 dB	18.5 dB	0.9 dB
27	ATSC	81.3 dBμV	27.1 dB	24.7 dB	7.1 dB
31	ATSC	80.7 dBμV	26.6 dB	25.3 dB	7.7 dB
33	ATSC	77.1 dBμV	26.7 dB	23.5 dB	5.9 dB

Start Clear MYCHPLAN 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.



SPECTRUM 1/3

Channel: Level: 38.5 dBμV

Task Timing

Start:  Start Now  On Date

Repeat every: days 0 hours 0 minutes 0

End:  Manual  On Date  Execute number of times 1

Power off after execution

### 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.



<b>Test point 165</b>	
2017-09-20 18:39:15	
<b>CH31 (554.00 MHz) - MAIN</b>	
MER	0.0 dB
CBER	1.0E-01
VBER	1.0E-01
LM	-17.6 dB
POWER	75 dBuV
CN	10.2 dB
OFFSET	0.0 kHz
<b>POWER (dBuV)</b>	
CH29 (538.00 MHz):	79.4
CH31 (554.00 MHz):	75.0
CH34 (578.00 MHz):	72.5
CH36 (594.00 MHz):	67.7

### COVERAGE ANALYSIS AND GPS

This option turns the **RANGERNeo** ATSC 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.

## Drive test GPS ★

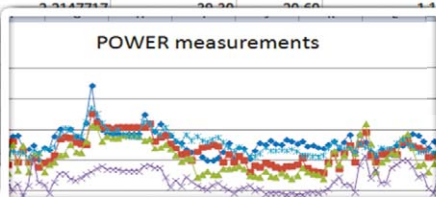
Create 3D maps with your measurements

### Run your coverage analysis over one of multiple RF channels simultaneously

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



TIME	LATITUDE	LONGITUDE	POWER (dBuV)	CN (dB)	OFFSET (kHz)
:45:33	41,4062683	2,2147717	32,70	16,50	-1,20
:45:36	41,4062683	2,2147717	35,40	19,30	-1,20
:45:39	41,4062683	2,2147717	35,40	19,40	-1,20
:45:42	41,4062683	2,2147717	31,70	15,10	-1,20
:45:45	41,4062683	2,2147717	33,00	14,40	-1,20
:45:48	41,4062683	2,2147717	32,70	14,30	-1,20
:45:51	41,4062683	2,2147717	30,70	10,90	0,00
:45:54	41,4062683	2,2147717	30,30	10,50	0,00
:45:57	41,4062683	2,2147717	30,30	10,50	0,00
:46:00	41,4062683	2,2147717	30,30	10,50	0,00
:46:03	41,4062683	2,2147717	30,30	10,50	0,00
:46:06	41,4062683	2,2147717	30,30	10,50	0,00
:46:09	41,4062683	2,2147717	30,30	10,50	0,00
:46:12	41,4062683	2,2147717	30,30	10,50	0,00



### 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**





**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, webservice, 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.

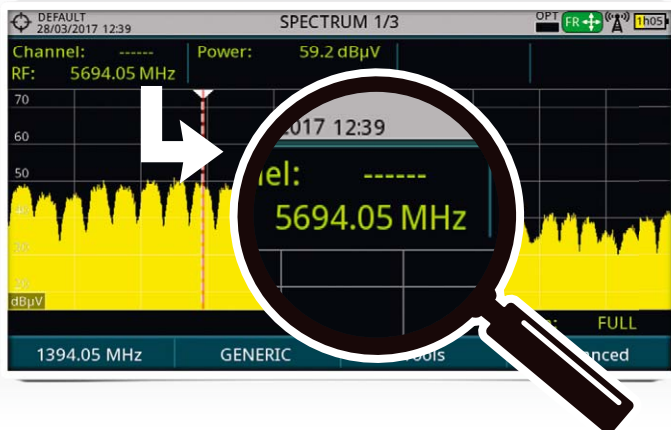
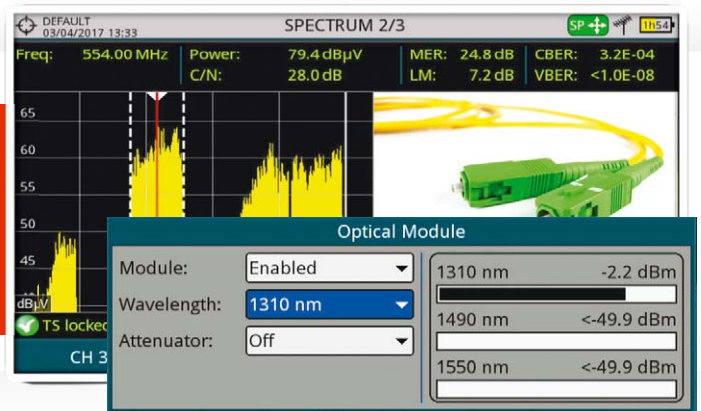




# Optical measurements option ... plus 6 GHz RF input

## 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.



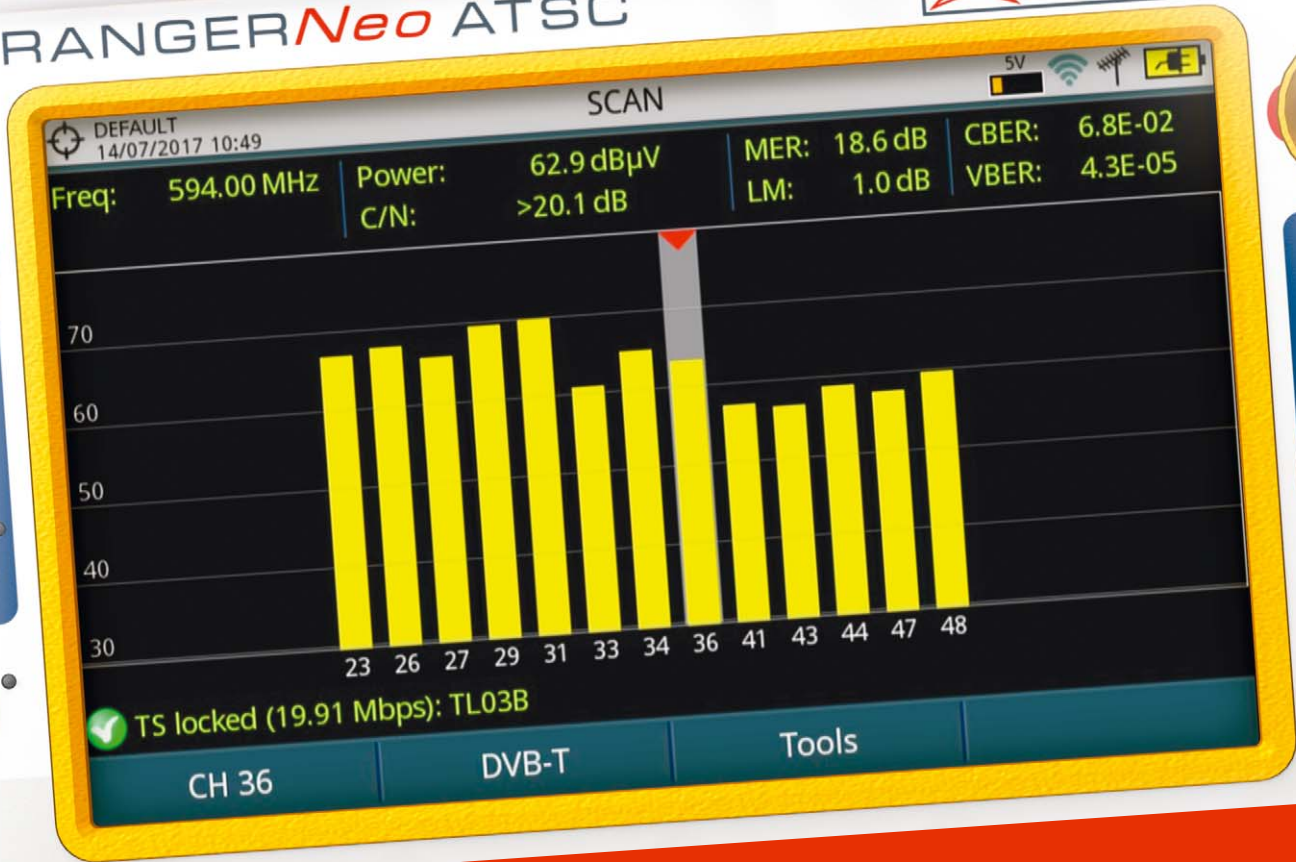
## 6 GHz RF auxiliary input

The **RANGERNeo 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



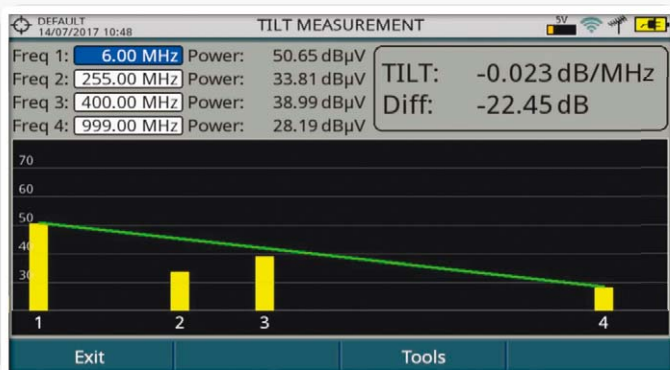
# RANGER<sup>Neo</sup> ATSC



## 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).

# DAB+

## ADVANCED DAB OPTION FOR RANGER Neo 2 ATSC ANALYZERS

The new advanced DAB option allows professional users to do DAB signal quality measurements and it includes many functions which are normally available in higher cost products only such as ETI recording, constellation diagram or echoes analysis.

# Advanced DAB/DAB+ option

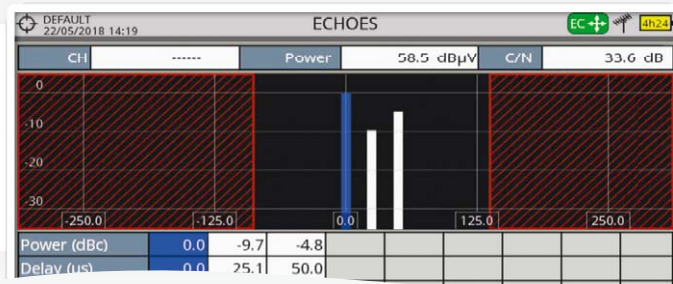
### ETI recording

ETI stands for Ensemble Transport Interface and it may be described as the equivalent to the Transport Stream for DAB. It is possible to record ETI on the analyzer so that it can then be copied to an external device for further analysis.



### Dynamic echoes analysis

DAB can also be operated in a Single Frequency Network (SFN) and therefore the dynamic echoes analysis becomes a handy function to have.



### DAB constellation diagram

DAB uses DQPSK modulation and so its constellation diagram shows a cloud of dots clustered around four points.





# Create, save and transfer data

## Ethernet connectivity

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





SPECIFICATIONS	RANGER <i>Neo</i> Lite ATSC	RANGER <i>Neo</i> + ATSC	RANGER <i>Neo</i> 2 ATSC
<b>DIGITAL BROADCAST STANDARDS</b>	ATSC DVB-C, QAM Annex B DVB-S, DVB-S2 DVB-S2 Multistream DSS, ACM / VCM / CCM	... Also includes: DAB, DAB+ (optional)	... Also includes: MPEG-TS
<b>AUDIO CODECS</b>	MPEG-1, MPEG-2, AAC, HE-AAC, Dolby Digital, Dolby Digital Plus		
<b>VIDEO CODECS</b>	MPEG-2, MPEG-4 / H.264, HEVC / H.265		
<b>INPUTS AND OUTPUTS</b>	- Universal RF input 50/75 Ω - HDMI output - IP input for remote control - Analogue Video/Audio input - 2xUSB (Type-A) for data transferring	... Also includes:	... Also includes: - ASI-TS input and output (BNC female 75 Ω) - IPTV multicast input (UDP / RTP, RJ45) - Common Interface slot
<b>FUNCTIONS</b>	- Constellation diagram - LTE ingress test - 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 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	... Also includes: - Spectrogram - Signal monitoring - Remote control ( <i>webControl</i> ) - 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
<b>SPECTRUM ANALYZER</b> 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		2 kHz (terrestrial) 10, 20, 30, 40, 100, 200 kHz 1 MHz
<b>MEASUREMENT MODE (please refer to STANDARDS section)</b> Frequency Margin  ATSC QAM ITU-J83 Annex B DVB-C QAM, ITU - J83 Annex A 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 (45 to 100 dBμV), SER, VBER, MER, C/N, Link margin Power (35 to 115 dBμV), BER, MER, C/N, Noise Margin, BCH ESR, LDPC 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		
<b>INTERNAL STORAGE</b>	6 GB for measurement protocols, screenshots and transport stream recordings		
<b>PC CONNECTION (via ethernet interface)</b>	NetUpdate 4 (free software) + Free and automatic firmware updates + User customised channel plans + Measurement reports and screenshots		
<b>GENERAL</b>	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)		
<b>BATTERY</b>	> 2h	> 4 h (smart battery)	> 4 h (smart battery)
<b>HARD CASE</b>	Optional	Included	Included

OPTIONS	RANGER <i>Neo</i> Lite ATSC	RANGER <i>Neo</i> + ATSC	RANGER <i>Neo</i> 2 ATSC
DAB, DAB+	-	Available	Available
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

## A new breed of analyzers for a new world



- ✓ Included
- Optional

	RANGER Neo						HD RANGER			
	4	3	2	+		Lite		Ultra Lite	Eco	
	DVB ISDB-T	DVB ISDB-T	DVB ISDB-T	ATSC	DVB ISDB-T	ATSC	DVB ISDB-T	ATSC	DVB	DVB
4K decoder	✓									
HEVC H.265 decoder + 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	2x Type A	2x Type A	1x Mini USB	1x Mini USB	
Battery time	> 4 h	> 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+ digital radio	✓	✓	●	●	●	●				
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	✓	✓	✓	✓	✓	✓				✓