

R&S® ETL TV Analyzer

The universal multi-standard platform for the analysis of TV and mobile TV signals



75 Years of
Driving
Innovation



ROHDE & SCHWARZ

R&S® ETL TV Analyzer At a glance

The R&S® ETL TV analyzer from Rohde & Schwarz is a completely new, universal multistandard platform for the analysis of TV signals. It combines TV test receiver and spectrum analyzer functionality in a single unit while providing high measurement accuracy. An innovative instrument concept allows new TV standards to be implemented on a software and hardware basis. Both digital (e.g. DVB-T/H) and analog TV standards can thus be integrated in a single instrument. The R&S® ETL uses realtime demodulation throughout

The R&S® ETL TV analyzer platform has been mainly designed for the commissioning, installation, and servicing of TV transmitters, for carrying out coverage measurements on terrestrial TV networks, and for performing measurements on cable headends. Using only a single unit, broadcast transmitters or CATV systems can be installed easily and with high precision, and maintained cost-effectively. Due to its compact and robust design, the R&S® ETL is suitable for mobile applications, which greatly simplifies network coverage measurements.

- ▮ Multistandard-compatible
- ▮ Software- and chip-based demodulators
- ▮ All demodulators operating in realtime
- ▮ Baseband outputs
- ▮ Wide range of TV signal analysis functions
- ▮ Integrated spectrum analysis functions
- ▮ MPEG-2 analysis and monitoring (optional)
- ▮ Instrument design optimal for portable and stationary use
- ▮ Capable of handling analog TV standards as well as DVB-T/H, ATSC/8VSB, DTMB (China) and DVB-C (J.83/A/C) digital standards



Analog, DVB-T/H, ATSC, DTMB, DVB-C – the all-purpose instrument

Demodulation in realtime

The software- as well as the hardware-based demodulators are designed for realtime operation throughout. This makes the R&S®ETL the only TV analyzer in its class that performs BER measurements and complete analysis consistently in realtime. The use of realtime demodulators has the additional advantage that demodulated analog video and audio signals as well as digital MPEG transport streams are available for further processing.

Wide frequency range

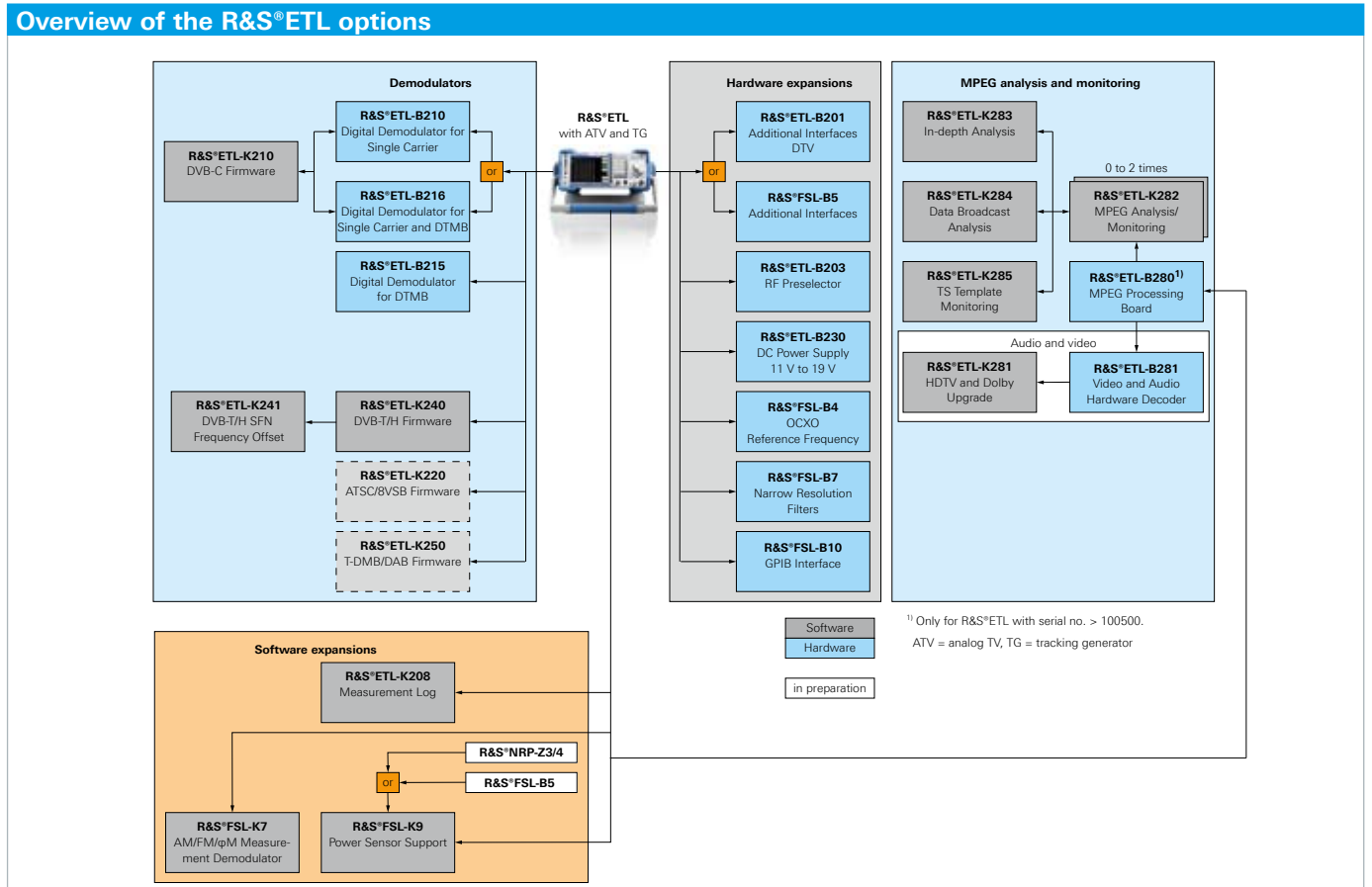
With a frequency range from 500 kHz to 3 GHz, the R&S®ETL covers not only the conventional broadcast frequencies but also the frequencies in the L and S bands, which are steadily gaining in importance. The TV analyzer's range of applications is thus considerably expanded.

Versatile measurements for ATV and DTV

The R&S®ETL offers a wide range of functions for measurements on digital TV signals. In particular, the constellation diagrams are displayed in very fine detail and build up at very high speed. As an alternative to the constellation diagram, the results of signal parameter measurements can be displayed together with the results of signal analysis in clear-cut tables. In the analog domain, the R&S®ETL offers as standard an extensive range of functions for measurements on vision and sound carriers. A video scope function, which is likewise provided as standard, enables further analysis in user-selectable video lines. Measurements such as C/N, CSO, and CTB have been implemented especially for CATV applications. The R&S®ETL can optionally be equipped with a preselector including an additional 75 Ω input.

The wide variety of TV-specific measurements provided by the R&S®ETL is complemented by measurements in the spectrum. Spectrum measurements such as shoulder distance in accordance with ETSI TR 101 290, channel power, and adjacent-channel power can thus be performed using a single instrument.

Special functions such as frequency counter and noise and phase noise markers round out the range of functions and turn the R&S®ETL TV analyzer into a real all-purpose instrument.



Analog, DVB-T/H, ATSC, DTMB, DVB-C – the all-purpose instrument

MPEG analysis and monitoring

In addition, the R&S®ETL may be equipped with MPEG options that provide detailed information about the MPEG-2 transport stream. Previously, this was possible only by using separate, highly specialized MPEG analyzers. You thus have a powerful tool at hand for verifying the accuracy of content that is pending transmission. The capability to send error messages over the integrated SNMP interface as soon as an error occurs in the transport stream expands the R&S®ETL's scope of applications to cover even long-term monitoring.

TV picture display

The quality of a TV picture often provides a very fast indication of the quality of the entire transmission path and its components. When equipped with the R&S®ETL-B280 und R&S®ETL-B281 options, the R&S®ETL can display TV pictures for analog TV as well as digital TV, thus increasing its already broad scope of analysis functions.



Specifications in brief

| General data | |
|----------------------------------------------|----------------------------------------------------------------------------------|
| Frequency range | 500 kHz to 3 GHz |
| Frequency accuracy | 1×10^{-6} |
| With R&S®FSL-B4, OCXO | 1×10^{-7} |
| Phase noise | typ. -103 dBc (1 Hz) at 10 kHz from carrier, 500 MHz |
| Displayed average noise level | |
| Preamplifier OFF | 50 MHz to 3 GHz: ≤ -140 dBm (1 Hz) |
| Preamplifier ON | 500 MHz: typ. -162 dBm (1 Hz) 3 GHz: typ. -158 dBm (1 Hz) |
| TOI | typ. +18 dBm |
| TV analysis | |
| Preselector | R&S®ETL-B203, internal, optional |
| RF input | N connector, 50 Ω , additional F connector, 75 Ω with R&S®ETL-B203 |
| Prerequisite for analog TV (ATV) | none, analog TV already included in base unit |
| ATV standards | B/G, I, D/K, K1, M, N |
| Prerequisite for DVB-T/H | R&S®ETL-K240 |
| Prerequisite for ATSC/8VSB | R&S®ETL-K220 (available from June 2008) |
| Prerequisite for DVB-C (J.83/A/C) | R&S®ETL-K210 with R&S®ETL-B210 or R&S®ETL-B216 |
| Prerequisite for DTMB | R&S®ETL-B215 or R&S®ETL-B216 |
| Prerequisite for T-DMB/DAB | R&S®ETL-K250 (available from December 2008) |
| Spectrum analysis | |
| Resolution bandwidths | |
| Standard | 300 Hz to 10 MHz in 1/3 sequence, additionally 20 MHz with zero span |
| With R&S®FSL-B7 | 10 Hz to 10 MHz in 1/3 sequence, additionally 1 Hz (with FFT filter) |
| Video bandwidths | 10 Hz to 10 MHz |
| I/Q demodulation bandwidth | 20 MHz |
| Detectors | pos/neg peak, auto peak, RMS, quasi-peak, average, sample |
| Level measurement uncertainty | <0.5 dB |
| Tracking generator | included in base unit |
| Frequency range | 1 MHz to 3 GHz |
| Output level | -20 dBm to 0 dBm |
| MPEG analysis and monitoring | |
| Prerequisite for MPEG analysis | R&S®ETL-B280 with R&S®ETL-K282 |
| Broadcasting standards | DVB, ATSC, SCTE |
| TS input | 1 (+1 internal) |
| Mode | ASI, SMPTE 310M |
| Max. data rate across all inputs | 128 Mbit/s |
| Video and audio decoding | |
| Presentation of TV picture on R&S®ETL screen | |
| Prerequisite for analog TV | R&S®ETL-B280 |
| Prerequisite for DTV (SD) | R&S®ETL-B280 with R&S®ETL-B281 |
| Video formats | MPEG-2 (MP@ML) H.264/AVC (MP) |
| Audio formats | MPEG-1/MPEG-2 layer I |
| HDTV and Dolby | R&S®ETL-K281 |
| Video formats | MPEG-2 (MP@HL) H.264/AVC (MP) |
| Audio formats | Dolby Digital AC-3 |

Ordering information

| Designation | Type | Order No. |
|-------------------------------------------------------------------|---------|--------------|
| TV Analyzer, 500 kHz to 3 GHz, with tracking generator | R&S®ETL | 2112.0004.13 |
| Accessories supplied | | |
| Power cable, quick start guide and CD-ROM (with operating manual) | | |

Options

| Designation | Type | Order No. | Retrofittable | Remarks |
|-------------------------------------------------|--------------|--------------|----------------|---------------------------------------------------------------------------------------------------------|
| Additional Interface DTV | R&S®ETL-B201 | 2112.0304.02 | yes (customer) | SER-DAT out, SER-CLK out, I in, Q in, IF out (4.571428 MHz) (same slot as R&S®FSL-B5) |
| RF Preselector | R&S®ETL-B203 | 2112.0327.02 | yes (service) | |
| Digital Demodulator for Single Carrier | R&S®ETL-B210 | 2112.0104.02 | yes (service) | |
| Digital Demodulator for DTMB | R&S®ETL-B215 | 2112.0156.02 | yes (service) | |
| Digital Demodulator for Single Carrier and DTMB | R&S®ETL-B216 | 2112.0162.02 | yes (service) | |
| DC Power Supply 11 V to 19 V | R&S®ETL-B230 | 2112.0256.02 | yes (customer) | |
| MPEG Processing Board | R&S®ETL-B280 | 2112.0362.02 | yes (service) | only for R&S®ETL with serial no. >100500 |
| Video and Audio Hardware Decoder | R&S®ETL-B281 | 2112.0356.02 | yes (service) | requires R&S®ETL-B280 |
| Ocxo Reference Frequency | R&S®FSL-B4 | 1300.6008.02 | yes (customer) | |
| Additional Interfaces | R&S®FSL-B5 | 1300.6108.02 | yes (customer) | video out, IF out, noise source control, AUX port, R&S®NRP-Zxx power sensor (same slot as R&S®ETL-B201) |
| Narrow Resolution Filters | R&S®FSL-B7 | 1300.5601.02 | yes (service) | |
| GPIO Interface | R&S®FSL-B10 | 1300.6208.02 | yes (customer) | |
| Firmware/Software | | | | |
| Measurement Log | R&S®ETL-K208 | 2112.0579.02 | | requires at least one digital TV option |
| DVB-C Firmware | R&S®ETL-K210 | 2112.0404.02 | | requires R&S®ETL-B210 or R&S®ETL-B216 |
| ATSC/8VSB Firmware | R&S®ETL-K220 | 2112.0456.02 | | available from June 2008 |
| T-DMB/DAB Firmware | R&S®ETL-K250 | 2112.0533.02 | | available from December 2008 |
| DVB-T/H Firmware | R&S®ETL-K240 | 2112.0556.02 | | |
| DVB-T/H SFN Frequency Offset | R&S®ETL-K241 | 2112.0562.02 | | requires R&S®ETL-K240 |
| HDTV and Dolby Upgrade | R&S®ETL-K281 | 2112.0604.02 | | requires R&S®ETL-B281 |
| MPEG Analysis/Monitoring | R&S®ETL-K282 | 2112.0610.02 | | requires R&S®ETL-B280 |
| In-Depth Analysis | R&S®ETL-K283 | 2112.0627.02 | | requires R&S®ETL-K282 |
| Data Broadcast Analysis | R&S®ETL-K284 | 2112.0633.02 | | requires R&S®ETL-K282, available from September 2008 |
| TS Template Monitoring | R&S®ETL-K285 | 2112.0640.02 | | requires R&S®ETL-K282 |
| AM/FM/ϕM Measurement Demodulator | R&S®FSL-K7 | 1301.9246.02 | | |
| Power Sensor Support | R&S®FSL-K9 | 1301.9530.02 | | requires R&S®FSL-B5 or R&S®NRP-Z3/4 |

Recommended extras

| Designation | Type | Order No. |
|----------------------------------------------------------|---------------|--------------|
| Documentation of R&S®ETL Calibration Values | R&S®ETL-DCV | 2082.0490.31 |
| 19" Rackmount Adapter | R&S®ZZA-S334 | 1109.4487.00 |
| Lemo Triax connector (mono) with connecting cable (open) | | 2067.7451.00 |
| Soft Carrying Bag | R&S®FSL-Z3 | 1300.5401.00 |
| Protective Hard Cover | R&S®EVS-Z6 | 5201.7760.00 |
| Matching Pad 75 Ω, L section | R&S®RAM | 0358.5414.02 |
| Matching Pad 75 Ω, series resistor 25 Ω | R&S®RAZ | 0358.5714.02 |
| Matching Pad 75 Ω, L section, N to BNC | R&S®FSH-Z38 | 1300.7740.02 |
| SWR Bridge 5 MHz to 3 GHz | R&S®ZRB2 | 0373.9017.52 |
| SWR Bridge 40 kHz to 4 GHz, 50 Ω | R&S®ZRC | 1039.9492.52 |
| SWR Bridge 40 kHz to 2.5 GHz, 75 Ω | R&S®ZRC | 1039.9492.72 |
| Mouse with USB Interface, optical | R&S®PSL-Z10 | 1157.7060.03 |
| Keyboard with USB Interface (US assignment) | R&S®PSL-Z2 | 1157.6870.04 |
| Spare F Adapter, female/female | R&S®FSHTV-Z61 | 2111.7111.02 |

Power sensors supported by R&S®FSL-K9

| Designation | Type | Order No. |
|---------------------------------------------------------------------------------------------------------------|-------------|--------------|
| USB Adapter (active) (required for using power sensors with the R&S®ETL, if the R&S®FSL-B5 is not installed) | R&S®NRP-Z3 | 1146.7005.02 |
| USB Adapter (passive) (required for using power sensors with the R&S®ETL, if the R&S®FSL-B5 is not installed) | R&S®NRP-Z4 | 1146.8001.02 |
| Average Power Sensor 10 MHz to 8 GHz, 200 mW | R&S®NRP-Z11 | 1138.3004.02 |
| Average Power Sensor 10 MHz to 18 GHz, 200 mW | R&S®NRP-Z21 | 1137.6000.02 |
| Average Power Sensor 10 MHz to 18 GHz, 2 W | R&S®NRP-Z22 | 1137.7506.02 |
| Average Power Sensor 10 MHz to 18 GHz, 15 W | R&S®NRP-Z23 | 1137.8002.02 |
| Average Power Sensor 10 MHz to 18 GHz, 30 W | R&S®NRP-Z24 | 1137.8502.02 |
| Average Power Sensor 9 kHz to 6 GHz, 200 mW | R&S®NRP-Z91 | 1168.8004.02 |
| Thermal Power Sensor 0 Hz to 18 GHz, 100 mW | R&S®NRP-Z51 | 1138.0005.02 |
| Thermal Power Sensor 0 Hz to 40 GHz, 100 mW | R&S®NRP-Z55 | 1138.2008.02 |
| Wideband Power Sensor 50 MHz to 18 GHz, 100 mW | R&S®NRP-Z81 | 1137.9009.02 |

Service options

| Designation | Type | Order No. |
|--------------------------------------------------------|------------|---------------------------------------------------------|
| One-Year Repair Service following the warranty period | R&S®RO2ETL | please contact your local Rohde & Schwarz sales partner |
| Two-Year Repair Service following the warranty period | R&S®RO3ETL | please contact your local Rohde & Schwarz sales partner |
| Four-Year Repair Service following the warranty period | R&S®RO5ETL | please contact your local Rohde & Schwarz sales partner |
| Two-Year Calibration Service | R&S®CO2ETL | please contact your local Rohde & Schwarz sales partner |
| Three-Year Calibration Service | R&S®CO3ETL | please contact your local Rohde & Schwarz sales partner |
| Five-Year Calibration Service | R&S®CO5ETL | please contact your local Rohde & Schwarz sales partner |

Service you can rely on

- | In 70 countries
- | Person-to-person
- | Customized and flexible
- | Quality with a warranty
- | No hidden terms

About Rohde & Schwarz

Rohde & Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

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Certified Quality System
ISO 9001
DQS REG. NO 1954 QM

Certified Environmental System
ISO 14001
DQS REG. NO 1954 UM

For data sheet, see
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and www.rohde-schwarz.com
(search term: ETL)

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