R&S®FS-K110
TETRA Release 2 Analysis
TETRA/TEDS measurements for the R&S®FSU/ R&S®FSQ

Years of
Driving
Innovation

ROHDE & SCHWARZ

R&S®FS-K110
TETRA Release 2 Analysis
At a glance

R&S®FS-K110 enhances the R&S®FSU spectrum analyzer and the R&S®FSQ signal analyzer for transmitter measurements on signals in line with TETRA Release 2/TEDS.

The software analyzes uplink and downlink signals in line with the EN 300 392-2 and EN 300394-1 standards. It measures the modulation quality (e.g. EVM, I/Q imbalance, frequency error) and spectrum parameters such as ACP on continuous and burst signals. It runs on the R&S®FSQ signal analyzers and R&S®FSU spectrum analyzers with the R&S®FSU-B73 vector signal analysis option installed.

Key facts
∎ Supports 25 kHz, 50 kHz, 100 kHz, 150 kHz channels
∎ Supports 4QAM,16QAM and 64QAM data symbols
∎ Measurements:
  ▪ Error vector magnitude (EVM)
  ▪ Power versus time (PvT)
  ▪ Adjacent channel power (ACP) due to modulation and transients
  ▪ Constellation diagram, selectable per carrier and per symbol type
  ▪ Bit stream
  ▪ Phase and magnitude error
∎ No trigger required
∎ Remote control via GPIB or LAN
∎ Capture length up to 108 slots
∎ Supports measurements via analog baseband inputs (for the R&S®FSQ with the R&S®FSQ-B71 option)

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Benefits and key features

Convenient analysis due to standard-conforming physical layer measurements and many automatic settings

Whether measurement of power ramping, transient ACP (adjacent channel power) or EVM, R&S®FS-K110 performs all measurements in line with the TETRA Release 2 specification. Parameters such as time and evaluation limits or channel bandwidth and channel spacing for ACP measurements are determined automatically. They are optimized to match the requirements posed by the specification. Only center frequency, channel type, slot type and modulation type need to be selected. A summary table provides a quick overview of the most important parameters.

Comprehensive analysis beyond the specification requirements for in-depth error analysis

Constellation diagrams can be displayed for all or for individual carriers as well as for different data types (sync, header, data, pilot). This helps to quickly locate performance trouble spots in different signal parts. Additional measurements, e.g. of phase or magnitude error versus time or EVM (error vector magnitude) over time and per carrier, enhance the analysis capabilities further.

All measurements derived from one I/Q data acquisition

All results are derived from a single data capture and thus ensure consistent analysis. EVM and ACP can, for example, be simply correlated. A seamless capture length of 108 slots speeds up the evaluation of a large number of slots. No external trigger is required, which simplifies the test setup. Slots with a matching number of subcarriers and the slot type are automatically detected and measured.

Includes analysis of standard TETRA signals

The R&S®FSQ-K70 vector signal analysis option for the R&S®FSQ signal analyzer or the R&S®FSU-B73 vector signal analysis option for the R&S®FSU spectrum analyzer add modulation analysis for 18 kHz π/4-DQPSK and π/8-D8PSK TETRA signals and enable standard-conforming EVM measurements including 95:th percentile evaluation. Spectrum measurements are covered by functions included in the basic spectrum analyzer, which even includes a TETRA filter for sweep or ZERO SPAN analysis.

Automate your measurements

All functions can be remote-controlled by SCPI commands either via GPIB (IEEE 488) bus or LAN interface.

Convenient and comprehensive analysis

The summary of results provides a quick overview of the most important numeric parameters. It is derived from all detected slots in the capture buffer.


Adjacent channel power (ACP) measurement: The bandwidth of the TX channel depends on the number of carriers; the power in the adjacent channels is determined by means of a TETRA filter.

Power versus time (PvT) determines the off-power for time intervals as defined in the standard before and after a slot with reference to the slot power.
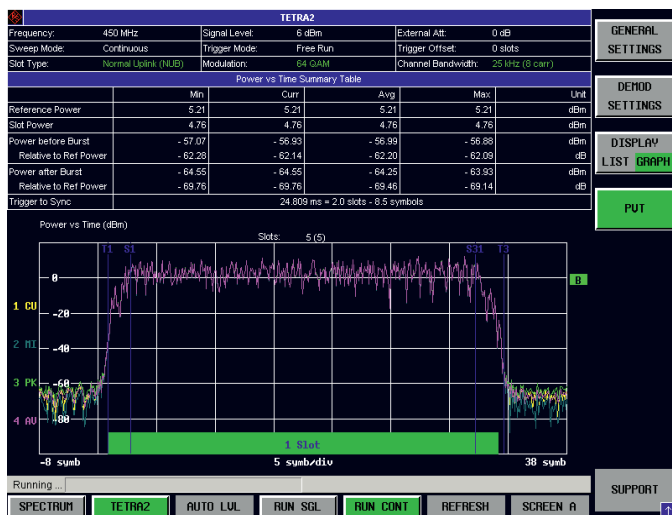
The constellation diagram shows the in-phase and quadrature-phase components of a slot in the capture buffer. It can be displayed either for all carriers and parts of a slot, or for selected carriers only, or for data, pilot, sync and header only.
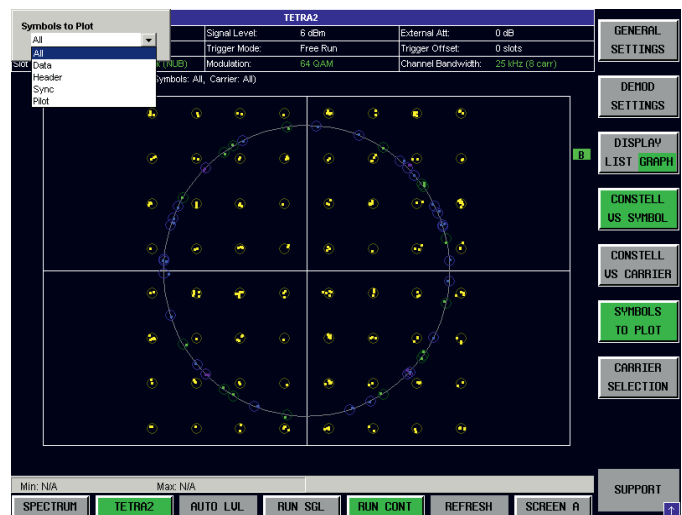
Ordering information

Designation	Type	Order No.
TETRA Release 2 Analysis	R&S®FS-K110	1309.9668.02

The R&S®FS-K110 option can be installed in the following spectrum and signal analyzers

Designation	Type	Order No.
Spectrum Analyzer, 20 Hz to 3.6 GHz	R&S®FSU3	1166.1660.03
Spectrum Analyzer, 20 Hz to 8 GHz	R&S®FSU8	1166.1660.08
Spectrum Analyzer, 20 Hz to 26 GHz	R&S®FSU26	1166.1660.26
Spectrum Analyzer, 20 Hz to 43 GHz	R&S®FSU43	1166.1660.43
Spectrum Analyzer, 20 Hz to 46 GHz	R&S®FSU46	1166.1660.46
Spectrum Analyzer, 20 Hz to 50 GHz	R&S®FSU50	1166.1660.50
Signal Analyzer, 20 Hz to 3.6 GHz	R&S®FSQ3	1155.5001.03
Signal Analyzer, 20 Hz to 8 GHz	R&S®FSQ8	1155.5001.08
Signal Analyzer, 20 Hz to 26 GHz	R&S®FSQ26	1155.5001.26
Signal Analyzer, 20 Hz to 40 GHz	R&S®FSQ40	1155.5001.40

Required option for the R&S®FSU spectrum analyzer, includes modulation analysis of TETRA Rel. 1 signals

Designation	Type	Order No.
Vector Signal Analysis	R&S®FSU-B73	1169.5696.03

Recommended option for the R&S®FSQ signal analyzer for modulation analysis of TETRA Rel. 1 signals

Designation	Type	Order No.
Vector Signal Analysis	R&S®FSQ-K70	1161.8038.02

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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For data sheet, see
PD 5214.1095.22
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