

TETRA Parametric vs Protocol Testing Using the CX300

In a radio shop environment, TETRA testing is centered on verifying that a radio is within RF specification and functionally operational before returning to service. This validation naturally breaks into two complementary categories: parametric testing, which confirms the radio's RF performance, and protocol testing, which verifies that it can correctly interact with a TETRA network. Together, these ensure both measurement compliance and real-world usability.

Parametric testing focuses on RF and physical-layer performance against defined specifications. Results are quantitative, with clear limits and pass/fail criteria. Typical measurements include frequency error, output power, modulation accuracy (e.g., $\pi/4$ DQPSK EVM and phase error), receiver sensitivity (BER vs. level), adjacent channel power and spectrum mask compliance, as well as audio quality metrics such as SINAD and distortion.

Protocol testing, by contrast, focuses on air-interface signaling behavior (Layer 2/3) rather than RF metrics. Validation is scenario-based and verifies that the radio correctly performs network procedures such as registration/attach, call setup and teardown, and participation in individual, group, and emergency calls.

In practice, parametric and protocol testing address different but complementary aspects of radio performance. Parametric testing provides quantitative validation of RF characteristics against specification limits, ensuring the transmitter and receiver are operating correctly at the physical layer. Protocol testing provides functional validation of signaling behavior, confirming that the radio can register, establish calls, and operate within a TETRA network.

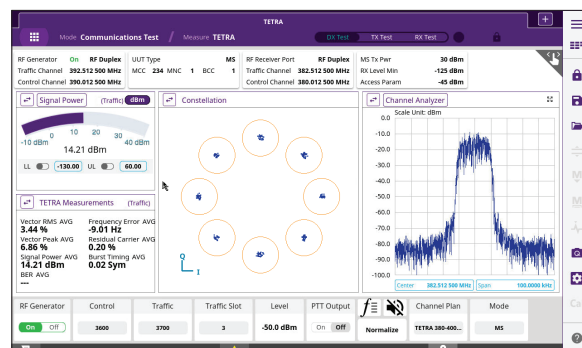
The VIAVI CX300 ComXpert supports both approaches in a single instrument by measuring RF performance while also generating and decoding TETRA signaling for functional verification. It supports functional testing, but it is not a full conformance or network emulation system.

Parametric Testing (RF/Physical Layer)

Parametric testing verifies the RF performance of the radio—independent of the TETRA signaling stack.

Typical measurements are numeric, standards-based RF metrics such as:

- Frequency error
- Output power
- Modulation accuracy (e.g., $\pi/4$ DQPSK EVM)
- Phase error
- Receiver sensitivity (BER vs level)
- Adjacent channel power/spectrum mask
- Audio quality (SINAD, distortion)



Parametric results of the TETRA Screen

Protocol testing validates the TETRA air interface behavior and signaling—how the radio interacts with a network.

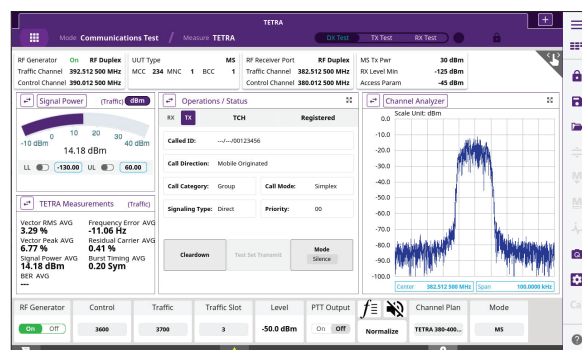
The VIAVI CX300 supports TETRA call simulation and signaling, but it is not a full network emulator.

Typical capabilities include:

- Establish basic TETRA links
- Emulate simple base station behavior
- Support call setup scenarios

Typical protocol validation scenarios include:

- Registration/attach
- Call setup/teardown
- Group call participation

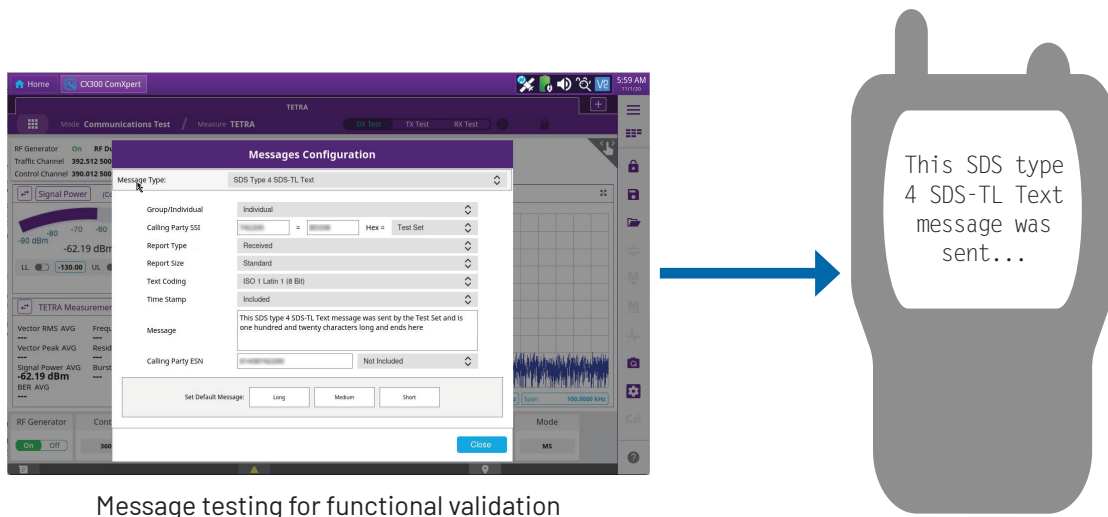


Protocol results include radio registration

Parametric vs Protocol Testing (Summary)

Aspect	Parametric Testing	Protocol Testing
Layer	Physical (Layer 1)	Signaling (Layer 2/3)
Focus	RF performance	Network behavior
Output	Numeric measurements	Call/session success
Typical Use	Alignment, repair, verification	Functional validation

Overall, the VIAVI CX300 ComXpert is well suited for parametric (RF) verification and supports protocol-oriented functional checks via TETRA call simulation and signaling, but it is not intended as a full conformance test platform or network emulator.



Message testing for functional validation



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