

Verify FRMCS Network Performance Under Real Railway Conditions

Real-Time Spectrum Analyzer Field Master Pro™ MS2090A
Handheld Cable and Antenna Analyzer, Spectrum Analyzer
and Vector Network Analyzer Site Master™ MS2089A

Gain confidence in FRMCS field measurements with a solution designed for over-the-air (OTA) analysis, time-synchronized TDD evaluation, and location-based coverage characterization.

For railway operators and network deployment teams, understanding real FRMCS performance in the field is critical to ensuring reliable mission-critical communications.

What is FRMCS?

FRMCS (Future Railway Mobile Communication System) is a 5G-based railway communication system supporting mission-critical operations. Unlike conventional systems, FRMCS introduces new measurement considerations driven by TDD structure, coexistence with GSM-R, and railway-specific propagation conditions.



Why Testing Matters

- Improve confidence in coverage measurements
- Detect coexistence issues faster
- Evaluate TDD performance accurately
- Correlate RF performance with location
- Reduce deployment and troubleshooting time

Technical Challenges

Challenges	Why it matters	Typical FRMCS context
GSM-R and FRMCS coexistence	During migration phases, FRMCS networks must operate alongside legacy GSM-R systems. Field measurements must identify potential interference and verify reliable network performance in mixed environments.	Band n100 (900 MHz) coexistence scenarios
TDD-based network operation	FRMCS deployments using TDD require measurements that accurately capture time-varying transmission behavior. Traditional measurement approaches may not fully reflect actual network performance.	Band n101 (1900–1910 MHz) operation
Railway-specific propagation environments	Signal coverage and quality can vary significantly between open tracks, stations, cuttings and tunnels. Understanding these variations is essential for validating network coverage and service reliability.	Trackside, tunnels, stations
Representative field measurements	Reliable deployment decisions depend on measurement methods that reflect real operating conditions rather than static or averaged assumptions.	Live railway network environments

Use Cases and Solutions

Use case	What needs to be tested	Recommended solution	Key product
GSM-R and FRMCS Coexistence assessment	Signal quality variations under interference conditions (RSRQ, SINR, RSSI relationship)	Measure OTA metrics (RSRP, RSRQ, SINR) under coexistence conditions.	MS2090A
FRMCS TDD performance validation	Differences between frame-based averaging and slot-level behavior	Use gated channel power measurement synchronized to DL slots.	MS2090A
Coverage and service quality verification	Understand how network performance varies along the railway route and identify potential coverage gaps before service issues occur.	Combine continuous RF measurements with GNSS location data to visualize coverage and signal quality across the network.	MS2090A
Troubleshooting and network optimization	Quickly identify performance issues and validate network improvements under real operating conditions.	Capture and analyze real-time OTA measurements in live railway environments to support faster diagnosis and optimization.	MS2090A MS2089A



Field Master Pro MS2090A

With MS2090A (using appropriate configuration and options), the following measurement conditions can be addressed:

- Simultaneous RSRP, RSRQ, and SINR measurement in OTA environments
- Channel power measurement synchronized to TDD DL slots
- GNSS-based coverage mapping

This enables measurement and analysis aligned with real deployment conditions, including interference, timing, and location.

Why Anritsu for FRMCS?

With 130 years of experience in communications test and measurement, Anritsu is a trusted partner for wireless, optical, microwave/RF, and digital solutions across R&D, manufacturing, deployment, and network optimization. For FRMCS, Anritsu combines proven 5G expertise with dedicated support for FRMCS frequency bands n100 and n101, helping railway communication equipment manufacturers validate devices from early development through production and field deployment. As a single supplier for lab and field test solutions, Anritsu enables a consistent path from design validation to deployment, supported by solutions already trusted by leading wireless infrastructure vendors.

Anritsu supports the complete FRMCS lifecycle:

Phase	Solutions
Device design	MT8000A
RF validation	MT8000A
Manufacturing	MT8870A
Field deployment	MS2090A MS2089A
Network optimization	MS2090A MS2089A