VIAVI

# Railway Telco and Signalling Assurance

**FRMCS • GSM-R • ETCS • GPRS • AIOps**

**Cybersecurity • Drive-Test • Interlocking**
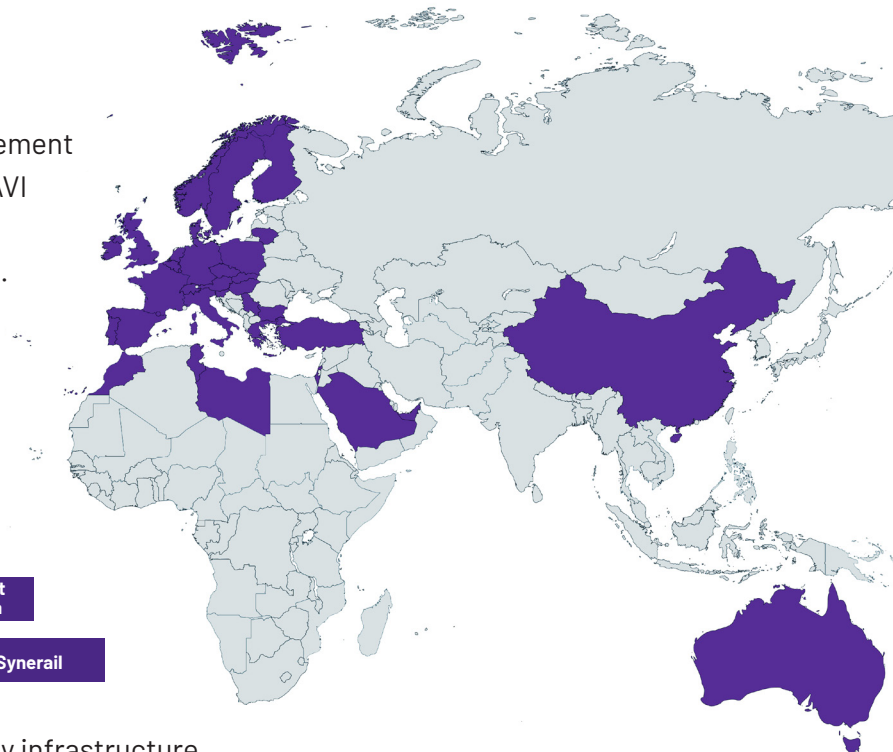
# VIAVI Railway and Mission Critical

VIAVI provides solutions to monitor and troubleshoot railway networks with confidence. We provide the necessary tools to ensure the highest quality of service, conduct preventive maintenance with AI and machine learning, ensure safety through cybersecurity and other tools to save time and costs.

Developed by experienced telecom and signalling engineers, it is intended to answer all the test, measurement and monitoring needs from teams working with existing 2G/3G/4G and GSM-R networks, as well as those planning to switch to 5G and the Future Railway Mobile Communication System (FRMCS). Our solutions are used daily on over 100,000+ km of rail tracks worldwide with Radio, Signalling, NOC and Safety/Security Engineers.

## Customers and References

Our portfolio is the de-facto, most-used railway telecommunication and signalling test, measurement and monitoring solutions in the rail industry. VIAVI supports railway operators in over 30 countries across Europe, Africa, Middle East, and Oceania.

| | | |
|---|---|---|
| ADIF | BaneDanmark | Bane NOR |
| CFL | Deutsche Bahn | LGV BPL |
| Eurotunnel | Infrabel | Irish Rail |
| Mobirail | Network Rail | NIF |

| | | | |
|---|---|---|---|
| ÖBB | ONCF | PKP | PTA – Public Transport Authority of Australia |
| ProRail | RFI – Rete Ferroviaria Italiana | SNCF Réseau | Synerail |

Our references include railway operators, railway infrastructure and track owners, contractors, network infrastructure providers and mission critical operators.

## Join our Railway User Group

Each year, worldwide customers, partners and railway professionals have the opportunity to share their experiences, challenges and concerns during the VIAVI Railway User Group. They help us to shape the design and implementation of future VIAVI products. We strive to listen to the voice of our customers to provide solutions answering specifically their current and upcoming needs. Open to non-customers, grab this opportunity to discover our offer through the voice of many satisfied railway operators.

# Product Portfolio and Solutions

**VIAVI Solutions offer a full range of solutions, products and services, to test, measure and troubleshoot ERTMS/FRMCS, GSM-R, ETCS and GPRS networks' quality-of-service and performance. These solutions are designed and developed to be used for technical and non-technical teams, during the life-cycle of a network, from network planning/acceptance to daily operation.**

Our new EVOIA portfolio creates a broader market offering for railway and MCx customers, and brings together:

- The successful the QATS railway telecoms and signalling solutions, previously offered by Expandium
- The market-leading NetProbe Drive Test railway solutions, previously offered by Comtest Wireless
- New practical and effective cybersecurity solutions for operational technology

EVOIA, built on the best of QATS and NetProbe, has been developed from the ground-up to offer 3 products:

- EVOIA Assure (passive monitoring and service assurance)
- EVOIA Drive Test (active testing) and EVOIA Pocket (active testing via smartphone)
- EVOIA Cyber (OT cybersecurity)

*The word EVOIA is derived from the Greek word 'Evvoia', meaning 'sense', and stands for Enhanced Visibility, Optimization, Investigation and Assurance.*

## For Railway Operating Companies
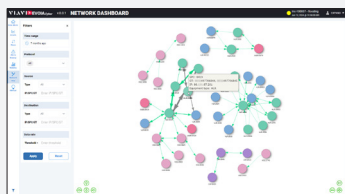


### EVOIA Cyber

- OT railway-focused cyber-threat alerts and forensics
- Attack vector identification from source to target
- Remediation guidance with ERTMS expertise
- Interlocking threat detection
- IEC 62443/TS 50701 compliance solution
- 3rd party SIEM integration
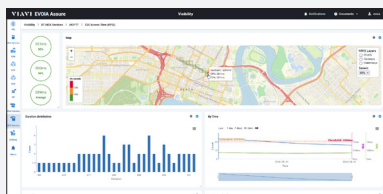
### EVOIA Assure

- Real-time GSM-R, ETCS, GPRS and IXL Service Assurance | FRMCS-ready
- End-to-end transaction will full CDRs
- Call tracing and Telecom Frame Tracing (R/T)
- Railway Emergency Call (REC) features
- Movement Authority Analysis
- Train Delay Investigation
- OBU/JRU processing and monitoring

### EVOIA Drive Test

- Radio Drive Test and Measurements
- Quality Analysis
- Interference detection
- Subset-093 KPIs/Metrics
- Autonomous usage with unattended Probes
- Spots non-compliant areas based on EIRENE specifications

Network Acceptance

Predictive Maintenance*

Security and Network Operations*
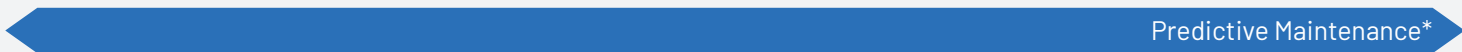
*based on Big Data Technologies featuring Artificial Intelligence (AI) and Machine Learning (ML)

## For Mission Critical Operators

Formerly provided by legacy Private Mobile Radio network technologies (TETRA, GSM-R...), Mission Critical features such as push-to-talk (MCPTT), group calls, video (MCVideo) and audio broadcasting, functional numbering, are now supported by standards over LTE and 5G networks. However, the technical complexity and criticality of the services require an independent solution to ensure the network's performance.

# ERTMS and FRMCS

Best-in-class Railway Telecommunication and Signalling Service Assurance for GSM-R, ETCS, GPRS, IXL and already FRMCS-ready.

# Solutions Across The Entire Network Life-Cycle

VIAVI Solutions offer a full range of solutions, products, and services, during the entire life-cycle of your railway telecommunication and signalling networks. Suitable for both current standards, such as GSM-R, ETCS, GPRS, and on upcoming standards such as the Future Railway Mobile Communication System (FRMCS). Either used from network planning all the way to network testing and optimization, or for your daily operations, VIAVI has you covered.

### NETWORK DEPLOYMENT VALIDATION

- Ensure compliance to stringent railway and safety/security standards
- NEM component and system validation
- QoS / SLA certification

### NETWORK OPERATION

- Railway telecom, signalling and interlocking monitoring
- Call tracing and telecom frame tracing
- Root-cause analysis and troubleshooting
- Train-delay investigation
- Legal reporting

### NETWORK TESTING AND OPTIMIZATION

- Automated and continuous radio quality drive testing
- Detect interferences with public networks
- OT Cyber forensics
- Advanced Analytics/BI
- Predictive maintenance

- Certify to UIC/ERA specifications and standards
- Guarantee neutrality by providing independent and non-biased solutions
- New tracks/lines rollout tests on telecom, signalling and interlocking
- Assist railway operators with the future transition to FRMCS (5G-based)

- Assure quality of service for NOC/SOC
- Alert and pinpoint network issues for faster resolution
- Minimize and/or prevent train-delays
- Ensure processes were respected during incidents requiring legal investigations.

- Alleviate Drive Test constraints through automation and unattended equipment
- Free-up personnel and save OPEX: "do and get more accurate tests with less"
- Improve operational efficiency with predictive maintenance based on machine learning
- Increase network's security and safety with recent railway cyber attacks

**EVOIA Assure: Railway Telco and Signalling Service Assurance**

Railway operators need dependable, unbiased, future-proof, secure, end-to-end monitoring and troubleshooting tools for railway telecommunication and signalling networks. Either for current-gen ERTMS or to prepare and deploy FRMCS, railway telecommunications must be totally monitored from end-to-end for performance, economic and safety reasons.

Our EVOIA Assure products were developed for and with railway operators across the globe, to monitor, detect, troubleshoot, and optimize any aspects of a railway's telecommunication and signalling networks.

# EVOIA ASSURE

## Passive Monitoring for GSM-R, ETCS and FRMCS

EVOIA Assure offers quality monitoring and troubleshooting solutions, designed from the ground-up for railway telecommunication and MCx networks. The solutions are built around the latest and upcoming industry standards such as the European Rail Traffic Management System (ERTMS), including GSM-Railway (GSM-R), GPRS, European Train Control System (ETCS) and the Future Railway Mobile Communication System (FRMCS).

Over 30+ railway operators entrust and use VIAVI Solutions products daily. EVOIA Assure (developed from QATS Railway, a best-seller product) monitors all interfaces and reconstruct all transaction end-to-end. It is our leading umbrella system gathering data from multi-sources: Radio Access Networks, Core Networks, IMS, MCx, on-board drive test equipment and more. It provides a powerful web-based dashboard platform to ensure the best quality of service and quality of experience for your network.

### KPIs and Alarms

A large set of Key Performance Indicators (KPIs) is available, providing the most meaningful metrics for day-to-day monitoring and/or reporting purposes.

With the addition of an alarm console, which automatically triggers alerts upon thresholds set by the user, or by comparing actual values with references learned from trends and machine learning, operators are able to monitor, and troubleshoot their network proactively.

## Tracing, Subscriber Activity, Radio Stats and more...

EVOIA Assure records the entire network's activity in real-time, using aggregated data collected by probes, cell traces and drive test equipment. Operators are able to replay long-term data records of any GSM-R or ETCS transaction that occurred in their networks. Specific condition and filter editors have been designed to easily find calls the operators need to investigate.
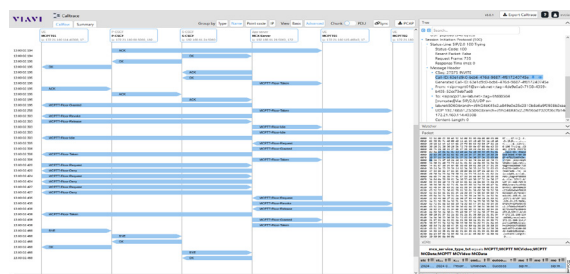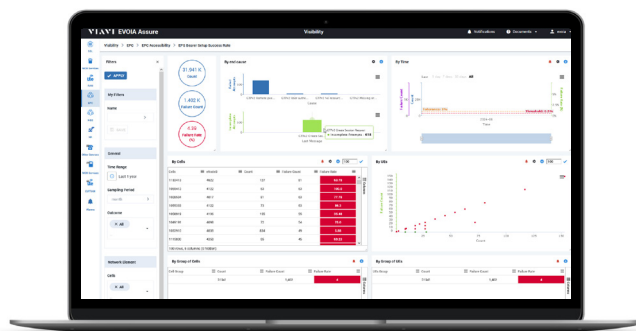




## Call Tracing

An all-in-one call tracing feature, which stores and displays all the network's transactions from end-to-end in a graphical scaled view. With this feature, railway operators can easily spot a transaction issue's root cause/equipment, and are able to export traces and analyze through packet analyzers, GSM, GPRS, GSM-R and ETCS protocols.

## Use cases

EVOIA Assure offers a plethora of use cases. Reach out to our team of experts if you would like a personnalized demo. Below are very few examples of what it can monitor/report:



- **RAN Mobility:** Handover Success Rate
- **RAC Accessibility:** RRC Setup Success Rate
- **EPC Accessibility:** EPS Bearer Setup Success Rate
- **MCx Services:** SIP Procedure Failure Rate
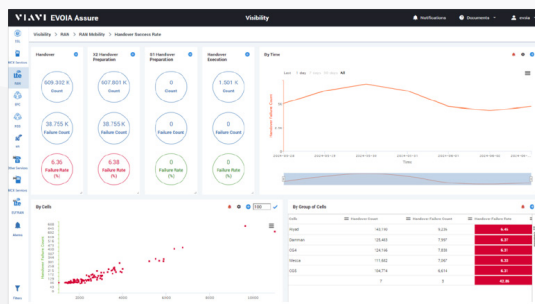
## Transitioning from GSM-R to FRMCS, our long-term commitment

Multiple manufacturers announced GSM-R obsolescence starting 2030. Its replacement, FRMCS, will use a 5G network, with railway features on top, that aims to answer to railway new needs: digitalization, ETCS geographical and functional expansion, Train Automation Target (ATO), Train Control and Monitoring Systems (TCMS), video usage for safety and more... just to name a few. This transition will offer many advantages, not just in speed and bandwidth, but also in security and resilience.

VIAVI Solutions is committed to maintaining GSM-R through its LTM (Long-Term-Maintenance) commitment program. GSM-R is due to operate alongside FRMCS until around 2040. Having provided for the railway market for decades, we fully understand railway operators and we are supporting drive test and passive monitoring for both GSM-R and FRMCS until 2040, and for FRMCS beyond this date.

# ERTMS Signalling and Interlocking Monitoring

By using EVOIA Assure, you can detect and analyze malfunctions affecting the overall quality of service, such as train run delays, end-of-session issues and many other metrics.

EVOIA Assure is being developed in close collaboration with Signalling Engineers to specifically address their needs, such as quickly determining whether an issue is related to GSM-R or ETCS. Because it uses a common architecture for both signalling and telecoms monitoring, it operates efficiently without requiring additional hardware and offers features such as Movement Authority Analysis, M_ERROR and M_MODE analysis, Subset-093 and Data Link Analysis, Train Delay Investigation, and more.

## Session Tracing

The main feature is to display ETCS Call Tracing as well as Telecom Frame Tracing. Users are able to visualize in one window performance monitoring, session tracing and troubleshooting of ETCS.

## ETCS L2 Performance Monitoring

By measuring all Subset-093 metrics based on real ETCS traffic, it can assess a network's accessibility, retainability and integrity by measuring KPIs such as connection establishment delays/errors, the connection loss rate and many other metrics.

## Train Trip Root Cause

Monitors all ETCS trains driving mode updates. If a train turns into Trip Mode, its emergency brakes are automatically applied which will disturb the railway traffic.

Able to identify the root cause of the Trip mode activation (e.g., T_NVCONTACT expired, missed linked Balise group, Unconditional Emergency Brake, and more), and enables a troubleshooting within the Subset-026 messages for behavior analysis.
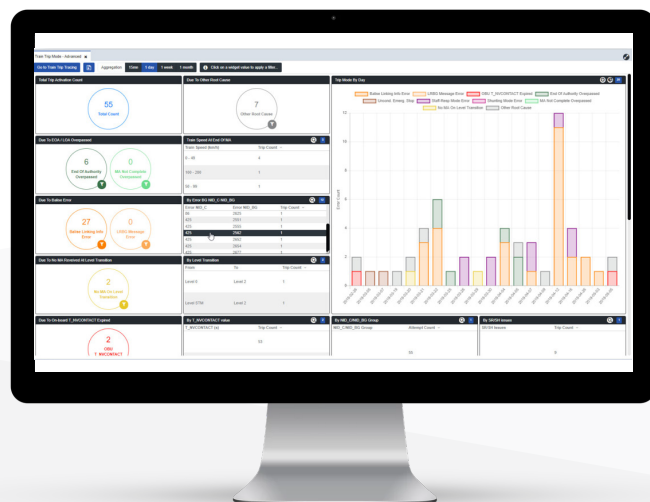


## Finding the Root-cause of Train Delays

Helps operators investigate if a train delay is the result of an ETCS issue. It can be used either proactively or in response to a detected issue by comparing any current train run with a reference timetable.

## Use Cases

EVOIA Assure offers many use cases for the signalling domain. Reach out to our team of experts if you ever asked yourself questions like the ones below:

- Is my GSM-R / GPRS network ready for ETCS?
- Why do I have so much train delays?
- Why do I often get balise, and balise linking errors?
- How can I get all the data from onboard JRUs (Juridical Record Units) to correlate with track-side date?

# EVOIA REC ALERT

## Railway Emergency Call Monitoring

EVOIA REC Alert is a prime example of custom development, designed for seamless real-time monitoring of Railway Emergency Calls. It features a simple yet highly effective user interface that continuously stores and tracks the highest priority calls, ensuring maximum network safety. With a built-in translation feature, it converts complex codes into easily understandable information, such as area names for example. As a result, EVOIA REC Alert is intuitive, easy to learn, and readily accessible for NOC teams.

**Details, Reports and Exports**

EVOIA REC Alert displays by default a summary of each RECs. If the user needs more information, the SCCP, mobile and fixed dispatchers' lists are displayed. The user can export the data to other third-party solutions and easily generate reports, which can be used for legal issues when incidents occur.

### Real-time REC Monitoring

EVOIA REC Alert will display the complete details of ongoing and completed railway emergency calls on its main interface.
It includes a map to pinpoint where the REC occurred.
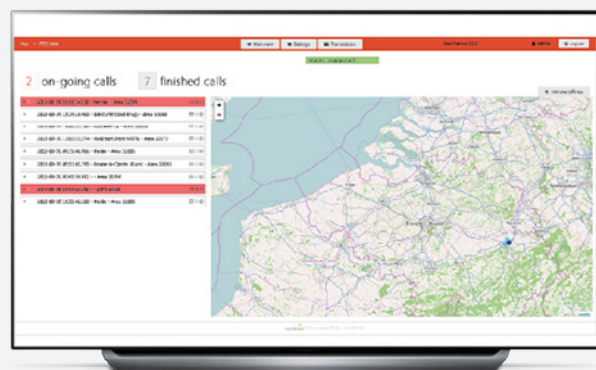
# Services

A dedicated Service Team provides a full range of services over the whole life cycle of your network: radio design, acceptance, optimization, operation and maintenance. Our team can work with off-the-shelf VIAVI products, develop dedicated tools or even work with your tools and solutions.

**Radio coverage:** To assess the quality of the radio coverage including RF design, EIRENE criteria analysis. From network deployment to performance control, the compliance to SLAs and SRS are analyzed and recommendations are given.

**QoS, interferences and compliance to standards:** This service aims to measure the quality of service through KPI or drive tests analysis. Recommendations are provided to improve the network's behavior in order to meet railway requirements in compliance with railway constraints.

**Telecom Safety Audit:** VIAVI safety audit ensures that Voice Group Call Services (VGCS), Railway Emergency Calls or Location Dependent Addressing (LDAs) are in conformity for maximum safety. Metrics include calls routed to expected dispatchers, calls successfully broadcasted to cells and dispatchers or calls established in less than SS2 seconds.

### Managed Services

A full service during a pre-defined timeframe allowing operators to spare their technical team, save time and gain from VIAVI specialized tools and expertise.

### Support Services

Our product platform is installed and an access to all fully fledged solutions is provided to the network operator with full support of VIAVI for the operator's various analyses.

### Pre-acceptance Consultancy Services

Our service team can capture, decode, provide full report with analysis and recommendations on the various issues detected before an acceptance in order to be fully compliant.

### Examples of Analysis

- Analysis of white communication/calls
- CM-88: detect/locate broken links
- V.110 and LDA analysis
- Train delay root-cause identification

# Active Tests and Measurements

Industry-leading Railway Drive Test Equipment and more.

# Introduction to Drive Testing

Railway operators depend on efficient and reliable telecoms networks to ensure operations run smoothly and efficiently. Our EVOIA Drive Test range of products is there to meet your budget and test/measurement requirements.

**Testing Network Compliance**

Drive Tests involve the use of specialized electronic equipment that measures the mobile network air interface. This can be either installed in a test vehicle or used as a portable device. The test systems can be operated manually, remotely or automatically, along a pre-defined route.
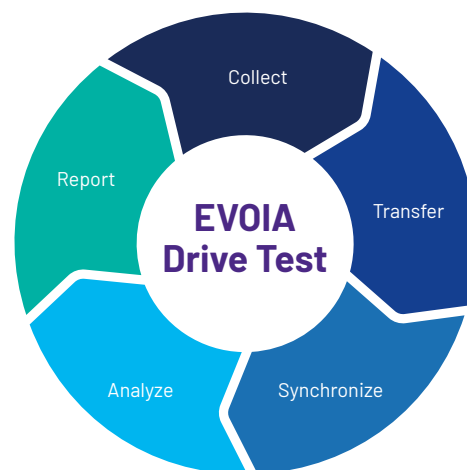
They collect and record information relating to a network's service in the given geographical area they are testing.

The results are then used to measure the Quality of Service (QoS) against a set of pre-determined KPIs, as well as for diagnostic and troubleshooting purposes.

The initial test and measurement of a rail telecoms network normally takes place at the installation and acceptance stages, using a Drive Test system. Even before installing the network, it is important to make sure the frequencies to be used are not affected by interference from third parties (band clearance).

During the installation phase, first coverage and network accessibility tests are performed. This is followed by reliability testing while moving across the network.

Eirene SRS and FRS together with O-2875 and Morane are key rail test specifications that are often used. These are normally met by the telecom vendors but it is key for a railway operator to know exactly which specification or standard the network is compliant to.

EVOIA Drive Test (Collect, Transfer, Synchronize, Analyze, Report)

1245.901.0923

| Example Network Acceptance Tests | |
|---|---|
| QoS | • Radio coverage<br>• Call setup and connection loss rate<br>• Handover break time<br>• Functional number registration/deregistration<br>• Test of ASCII functions<br>• O-2875 – EIRENE QoS requirements |
| Additional mandatory tests to comply to ETCS L2 | • O-2475 data testing in circuit switch mode<br>• O-2475 data testing in packet switch mode |
| Additional functionality testing | • Intra and extra system interference<br>• E2E Voice Quality test<br>• 3G, 4G, 5G MNO interference<br>• Radio performance benchmarking<br>• TETRA service |

# EVOIA DRIVE TEST

## Active GSM-R and ETCS Network Testing

## The Drive Test Portfolio

Choose the right EVOIA Drive Test solution to suit your budget and requirements. The wide range of options means you can collect data using remote, automated, and manually operated systems, installed in a vehicle or as portable devices.



**Installed Racks and Cabinets**
for test trains

**Portable Trolleys**
for network testing and certification

**Portable Backpacks**
Easy to use for certification

**Smartphone Solutions**
2G, 3G, 4G, and 5G
App-based testing

**Operational Methods: Manual or Unattended**

Collecting data from EVOIA Drive Test equipment is easy. You can collect data remotely, and even automatically in some instances, with unattended Drive Test. You do not need to physically dedicate an operator on site, which saves you costs and time. Data collection can be triggered by time, distance or geolocation. You can schedule repetitive test patterns, collect measurements and events and receive real-time alarms. If you prefer manual data collection, simply use an operator in attendance to start/stop tests, and change test configurations using the expert onboard option.

## Installed Rack Solutions

Dedicated test trains provide the facility to permanently install Drive Test equipment in racks or cabinets.

Each solution is configured based on customer requirements and can be set up to be operated manually, remotely or automatically, along a pre-defined route.

## Portable Solutions

Diagnostic and maintenance teams often find it convenient to use portable Drive Test solutions. That's because the test train may not always be in the right location at the right time, to run the necessary telecoms tests. This is especially true when frequent testing is needed for ECTS level 2 operational lines.

Portable trolleys and backpacks make it easy to run the same rail telecoms diagnostic tests, whenever and wherever they are needed.

### Portable Key Features

- Allows full network certification for GSM-R Voice, CS, PS and ETCS L2
- Use in manual, remote, and unattended modes
- Up to 3 trace modem 8W
- 1 RF scanner (TSME)
- 1 odometry and GPS onboard
- Battery life: 4 hours continuous operation

## Smartphone Solutions

EVOIA Pocket makes it easy to both verify railway telecom network deployments and ensure ongoing service assurance.

Because it is App-based, it's straightforward to script and run automated tests on a smartphone. Then it is just as easy to transfer all data collected for further analysis and reporting.

### Smartphone Key Features

- Suitable to test and measure 2G, 3G, 4G and 5G railway telecom networks
- EVOIA Pocket App runs on most commercial smartphones
- Supports both Qualcomm and HiSilicon (Huawei) chipsets with one universal license
- Transfer licenses from one device to another
- Real-time view of license usage
- Easy to set up and launch automatic scripts
- Store data in the handset and download manually, or upload it automatically to a central server

# Benefits of Unattended Drive Testing

With Unattended Probes, users are able to create and upload remotely, different testing scenarios to the onboard probes. Once the onboard probes have been set, they become fully autonomous and transmit the metrics used to build KPIs providing the actual network's quality-of-service.



### Key Features

- Latest modems: GSM-R 8W, 3G, 4G

- Scanner available

- Smart power module: includes batteries to avoid dropped calls when the train is powered-off

- Autonomous: remote management and automatic data upload to the Drive Test server

- Scenario starts based on GPS/trackline position
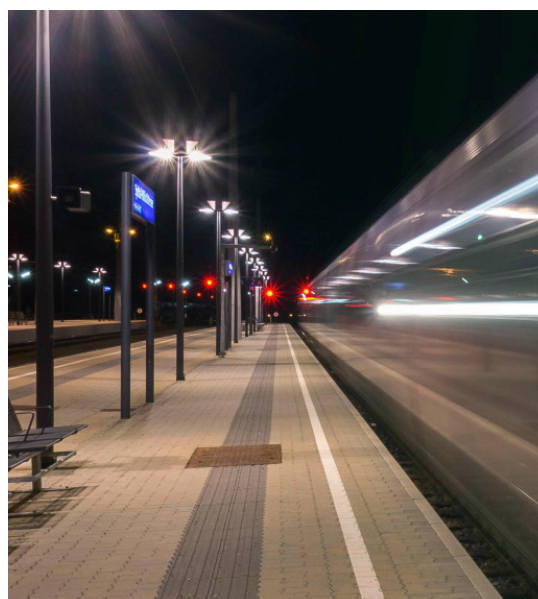
- Certification: EN 50155, 45545-2 and more

|  | Traditional Drive Test | Unattended Probes |
|---|---|---|
| Type | Active | Active and Passive |
| Usage* | On-field, requires a technician or an engineer onboard the train | Remotely, no one needed onboard |
| Continuous Monitoring | No | Yes |
| Coverage | Limited, usually sections | Entire lines/network |
| Train Type* | Measurement trains | Measurement, maintenance and/or commercial trains |
| Data Transfer | Manual | Automatic data transfer |
| Availability* | Limited, requires booking a train | 24/7 |

*Cost-effective solution: the Unattended Probes solution enables a lot of cost-savings for the railway operator. All the information is accessible and can be downloaded from the front-end of the solution, making it more cost-effective, faster, and less time-consuming for operators than conventional drive-tests. After the initial installation, no further intervention is needed on the train equipment side.*

**Compatibility**

| Non-Exhaustive List of supported-Devices | |
| --- | --- |
| **Cab Radios** | • Funkwerk<br>• Triorail<br>• Selex<br>• Sierra Wireless<br>• Sagem<br>• Sepura (Tetra) |
| **RF Scanners** | • RandS TSME<br>• RandS TSM-L<br>• RandS TSM-Q<br>• RandS TSMU and TSMW<br>• Willtek Griffin |
| **Standard Modems** | • Sierra Wireless<br>• Triorail<br>• Quectel |

**EVOIA Drive Test Takeaways**

| | What to Test | When to Test |
| --- | --- | --- |
| **Unattended Drive Test**<br>*e.g., Racks, trolleys, and backpacks* | • Standard network acceptance<br>• Network monitoring<br>• High sampling KPI collection | • Frequent measures (high numbers)<br>• Generate traffic<br>• Test coverage and simple QoS |
| **Manual Drive test**<br>*e.g., Trolleys and backpacks* | • EIRENE acceptance test<br>• ERTMS E2E QoS verification | • Dedicated train not available<br>• Line certification<br>• Complex tests needed<br>• Flexibility needed |
| **Remote Drive Test**<br>*e.g., Test trains, trolleys, and backpacks* | • EIRENE acceptance test<br>• ERTMS E2E QoS verification<br>• Interference, blocking etc<br>• 4G or 5G Coverage<br>• Tetra assessment | • Accurate network measurement<br>• Line certification<br>• Complex test needed<br>• MNO assessment |
| **Pocket**<br>*e.g., Smartphone* | • 2G, 3G, 4G or 5G coverage | • Measure KPs such as: radio coverage, interference detection, telecom quality of service including dropped calls, initiation time, and throughput |

# EVOIA Cyber

Detect, discover and manage OT cybersecurity issues on GSM-R railway telecoms, and ETCS signalling systems with AI and machine learning.

# OT CYBERSECURITY

## Railway networks are vulnerable to cyber-attacks and security threats

Railway operators face a complex regulatory system that requires a deep understanding of operational cybersecurity measures. In addition, European railways are undergoing major changes in their operations, systems and infrastructure due to digitalization and increased connectivity. Implementation of cybersecurity requirements is mandatory for the industry's digital expansion, for its security and safety.

OT cybersecurity is crucial for protecting critical infrastructure and industrial systems from cyber threats, ensuring the safety of operations, and preventing disruptions that could have severe economic, environmental, or social consequences.

By enhancing resilience, facilitating secure integration with IT systems, and building trust with stakeholders, OT cybersecurity ensures the continuous and safe operation of essential services while adapting to emerging threats and future challenges.

The railway sector is increasingly vulnerable to cyber-attacks, causing potential safety and service disruption issues. The resulting economic and, or reputational consequences could be disastrous. While some well-documented attacks have taken place in Germany, Spain, Poland, and the UK over the last few years, none have yet directly compromised critical infrastructure. The need for vigilance is becoming increasingly important worldwide when cyber-attacks are on the rise.

**We are in a unique and privileged position at VIAVI. As members of EUWENA and UNIFE, a contributor to developments within the UIC and the ERA, and a leading provider to over 30 customers worldwide, we are using our extensive 20 years of experience in monitoring and troubleshooting to offer cybersecurity, from and to, railway experts.**



**Key Functionalities of OT Cybersecurity**

Stay on the lookout and get real-time alerts and forensics report if something happens:

- Attack vector identification source and target of the attack
- Scenario identification
- Raw data of event(s) triggering alerts
- Historical information

Response in alert dashboard:

- Potential impacts available to SOC
- Remediation guidance with ERTMS expertise

## Reaching IEC 62443, TS 50701, and NIS2 Requirements

EVOIA Cyber helps Telecom, Signalling, SoC technicians and engineers, to monitor access from untrusted networks, audit records generated by equipment and protect the integrity of transmitted information in line with regulations.

IEC 62443 is an international series of standards that address cybersecurity for operational technology in automation and control systems while TS 50701 provides guidance and specifications specific for railway operators, system integrators and product suppliers.

NIS2 requires EU Member States to incorporate it into their respective national cybersecurity laws by August 2024. Centered on three pillars: capabilities, risk management and reporting, and co-operation and information exchange, the NIS2 Directive seeks to enhance cybersecurity by:
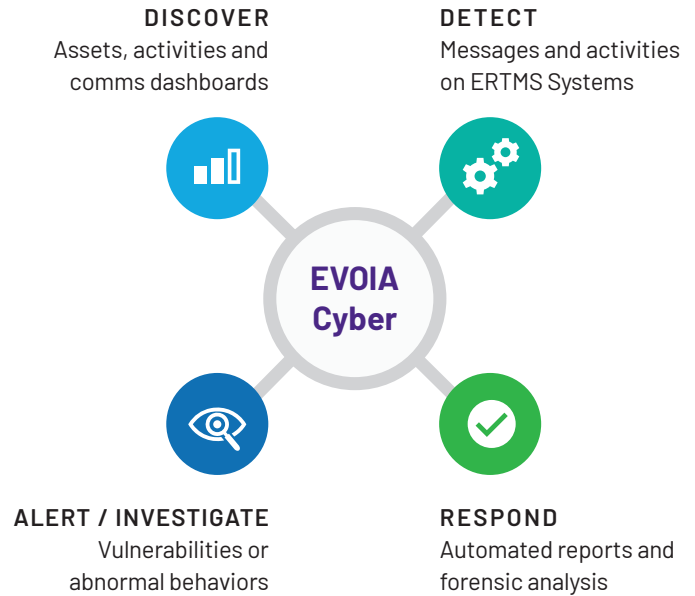
- Defining a minimum set of measures
- Ensuring there is a risk-based approach to managing cybersecurity
- Enforcing management accountability
- Reporting and sharing information on significant incidents

## SIEM/SOAR Integration

EVOIA Cyber can be integrated with the operator's SIEM (Security Information and Event Management) or SOAR (Security Orchestration, Automation, and Response) solutions if needed.

It is available as a standalone system or can be integrated into an existing VIAVI Railway solution.

Using the same data lake and VIAVI probe infrastructure, means you can integrate new cyber functionalities to discover system vulnerabilities, detect attacks, monitor current statuses, and manage issues more quickly and effectively.

**DISCOVER**
Assets, activities and comms dashboards

**DETECT**
Messages and activities on ERTMS Systems

**EVOIA Cyber**

**ALERT / INVESTIGATE**
Vulnerabilities or abnormal behaviors

**RESPOND**
Automated reports and forensic analysis

### Use Cases

- Identify calls to RBCs starting from an unauthorized BTS
- Identify ETCS connection attempts made by unauthorized SIM cards
- Identify unknown eurobalises, reported by trains or from unexpected location.
- Identify ETCS level and mode changes in unexpected positions
- Identify a high number of call attempts to an RBC over a period of time.
- Identify simultaneous calls from the same SIM card

**DATA INGESTION**

**VISUALIZATION**

**THREAT DETECTION**

**ALERTING**

**INVESTIGATION**

**RESPONSE**

# EVOIA CYBER

## Railway Cyber-attack Monitoring

**Leveraging AIOps**

AIOps, or Artificial Intelligence for IT Operations, leverages AI and machine learning to enhance and automate IT operations. It analyzes large volumes of data from IT systems to detect anomalies, predict potential issues, and identify root causes, enabling faster incident resolution and proactive management. By automating routine tasks and reducing noise from irrelevant alerts, our implementation of AIOps improves operational efficiency, optimizes system performance, and help IT and technical teams to manage the growing complexity of modern IT environments.

**Key Features of EVOIA Cyber**

- Cyber sniffing of passive data
- Designed to track suspicious messages and sessions in monitored traffic
- Supports a range of pre-defined detection algorithms to spot abnormal events on GSM-R and ETCS procedures
- Powerful AIOps
- Sends alerts in real-time
- Conduct further analysis at protocol level in post-processing to better understand the pattern of attacks conduct
- Uses existing hardware, where possible

**Safety and Security**

EVOIA Cyber applies a proven framework that proactively and automatically detects OT security vulnerabilities and cyber threats, reveals unknown breaches, and alerts relevant stakeholders. Below are some possible cyber-attack scenarios and/or threats with the possible impact/risk.

| Cyber-attack Scenario | Possible Impact or Risk |
|---|---|
| Stolen SIM card | Traffic disturbance |
| ETCS L2 service degradation attempt on train | Safety (train accident) |
| Intrusion attempts on ETCS Network | Information Leaks |
| Global GSM-R disturbance attempt | Train stop, train delays |
| Local GSM-R disturbance attempt | Train stop, EVOIA REC Alert inhibition |
| Alteration of train presence on a track session | Safety (train accident) |

# MISSION CRITICAL COMMUNICATIONS

## Beyond Railways - troubleshooting, reporting and monitoring solutions for Mission Critical Operators

**EVOIA Assure-QoE solutions for mission critical systems using 3GPP-based push-to-x and mobile data services**

The Emergency services, power plants, offshore platforms, and the transportation industry, are just some of the organizations who depend on public and/or private networks for their mission critical communications.

At VIAVI, we understand that maintaining a high quality of service and quality of experience in such technically complex environments is just as important as providing the service itself.

Our expertise in testing, measuring and managing quality of service (for both telecoms networks and mission critical communications systems means we can give you all the support you need

Use our solutions to monitor your mission critical communications networks, keep track of SLAs and troubleshoot, easily and quickly.

### Key Features

- Real-time end-to-end systems solutions for mission critical communications running on public and/or private networks

- Check KPIs, SLA performance with our configurable EVOIA Assure reporting dashboard

- Troubleshoot to pinpoint issues quickly and easily with EVOIA Assure, our comprehensive solution

- Test the network automatically or on demand with EVOIA Drive Test solutions to test coverage vs SLAs and identify interference issues

- Suitable for group calls, video calls, chat, emergency calls, MC Data calls and more

- Powerful reporting and alerting features

- 4G and 5G ready

### Example of MCPTT KPIs

**3GPP TS 22.179 version 14.3.0 KPIs**
- MCPTT Access time (KPI 1)
- End to end MCPTT Access time (KPI 2)
- Maximum Late call entry time (without application layer encryption) (KPI 4)
- Maximum Late call entry time (with application layer encryption) (KPI 4)

**Additional KPIs**
- MCPTT identifiers
- Group Broadcast Group
- MCPTT Emergency Group Call
- MCPTT Group Call
- Broadcast Group
- MCPTT Request
- Preemption
- Interworking with non 3GPP PTT systems
  - Interaction with telephony services
  - Legacy land mobile radio GSM-

# REQUEST OUR RAILWAY AND CRITICAL COMMUNICATION ARCHITECTURE POSTERS



VIAVI covers all protocols and interfaces in mission critical and railway networks. Our teams closely follow the latest specifications and add new protocols and interfaces, twice a year at each product release.

Request our free network architecture posters at sales.railway@viavisolutions.com.

**About VIAVI Solutions Inc.**

VIAVI (NASDAQ: VIAV) is a global provider of network test, monitoring and assurance solutions for communications service providers, enterprises, network equipment manufacturers, government and avionics. We help these customers harness the power of instruments, automation, intelligence and virtualization to Command the network. VIAVI is also a leader in light management solutions for 3D sensing, anti-counterfeiting, consumer electronics, industrial, automotive, and defense applications.

Learn more about our railway offering at www.viavisolutions.com/railway or contact our Sales team at sales.railway@viavisolutions.com

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