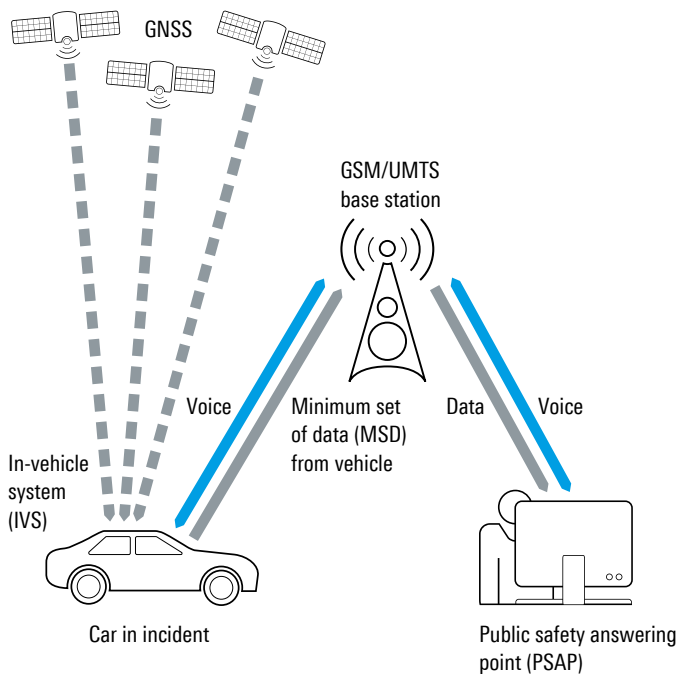


TEST YOUR eCALL AND ERA-GLONASS SYSTEM MODULES

The R&S®CMW500 and R&S®SMBV100B are the ideal team for motor vehicle type approval testing of your eCall and ERA-GLONASS cellular modems and their GNSS receivers in line with the EU 2017/79 regulation.

eCall/ERA-GLONASS data transfer principle



Your task

The European Union and the Russian Federation mandated intelligent telematics-based vehicle safety systems for several vehicle categories to speed up emergency response times in order to save lives. eCall and ERA-GLONASS are electronic safety systems for cars. In the event of a serious road accident, they automatically call the single emergency call number 112 for local emergency medical services in the EU and the Russian Federation. They can also be manually activated.

In case of an accident, the eCall/ERA-GLONASS in-vehicle systems (IVS) initiate an in-band modem data transfer to the local public safety answering point (PSAP) via the cellular network. The IVS transfers a standardized minimum set of data (MSD) containing information such as the number of passengers, the time and the GNSS coordinates of the accident. Additionally, a voice connection is established since the car occupant(s) might be able to speak.

The Russian ERA-GLONASS system is harmonized with the European eCall standards but specifies some extensions to better support the Russian infrastructure. This includes additional SMS functionality for the MSD transfer in case in-band data transmission fails.

eCall and ERA-GLONASS emergency call systems for motor vehicles consist of several components, including an in-band modem with antenna (such as for GSM or UMTS) for sending the emergency call, a GNSS receiver for determining the accident location, crash sensors for detecting the accident, a microphone and loudspeaker for voice communications, an emergency power supply and a pushbutton for manual activation.

As a safety system, the in-band modems must be highly reliable and correctly transmit MSD data. This is particularly critical in cellular networks optimized for voice transmissions, such as GSM or WCDMA. Testing eCall and ERA-GLONASS system components and overall system performance in real-world mobile network and satellite environments can easily become time-consuming, costly and very challenging. And since environmental conditions might change, test results are hardly reproducible.

Rohde & Schwarz solution

Rohde & Schwarz offers a compact solution for reproducible end-to-end functional and conformance testing of eCall and ERA-GLONASS modules. The R&S®CMW-KA094 eCall application software and the R&S®CMW-KA095 extension for ERA-GLONASS are compliant with the applicable standards. The software packages simulate a PSAP and remotely control the R&S®CMW500 to emulate a cellular network in the lab or test house.

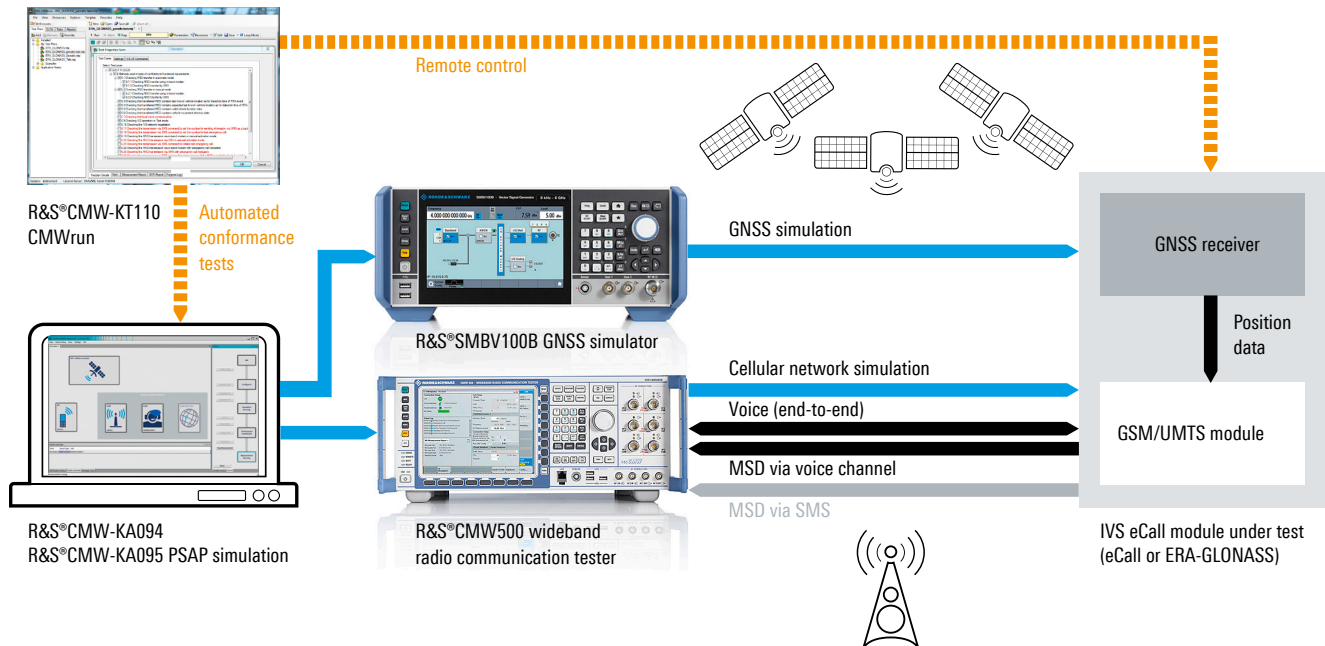
They also control the R&S®SMBV100B GNSS simulator, which provides the GNSS coordinates required by the IVS to compile the MSD. This setup makes it possible, for example, to verify if the IVS modem is able to trigger an emergency call, send the correct raw MSD data and establish a voice connection with the PSAP – fully independently of any real-world mobile network.

To verify whether the IVS modules are in line with the applicable standards, the R&S®CMW500 tests all important parameters such as MSD transmission timing, MSD decoding including GNSS position accuracy and, in the case of ERA-GLONASS, MSD transmission triggering via SMS.

Automated module conformance tests

To simplify extensive conformance tests, the R&S®CMWrun sequencer software tool is added. This R&S®CMW-KT110 option provides ready-to-use test sequences for eCall and ERA-GLONASS end-to-end and in-band modem conformance testing in line with the applicable standards. The available packages test the in-band modem conformity against standards such as CEN EN 16454, ETSI TS 103412 and GOST R 55530 (GOST 33467). You can conveniently select and combine the required test sequences on the straightforward user interface. R&S®CMWrun automatically configures the test instruments, the PSAP and, if supported, the IVS under test via remote control. It executes the selected tests and generates a complete test report with pass/fail indication for each test case. The ability to verify compliance with standards at an early design stage makes it possible to take corrective action and optimize an IVS module in a timely manner.

Compact setup for functional and conformance testing of eCall and ERA-GLONASS IVS modules



Standard-compliant GNSS performance testing

Not only must the in-band modem part of the IVS module conform to eCall and ERA-GLONASS specifications, its GNSS receiver also needs to be accurate and in line with the regulations. As a full-fledged GNSS simulator, the R&S®SMBV100B is the ideal instrument for performance testing of GNSS receivers.

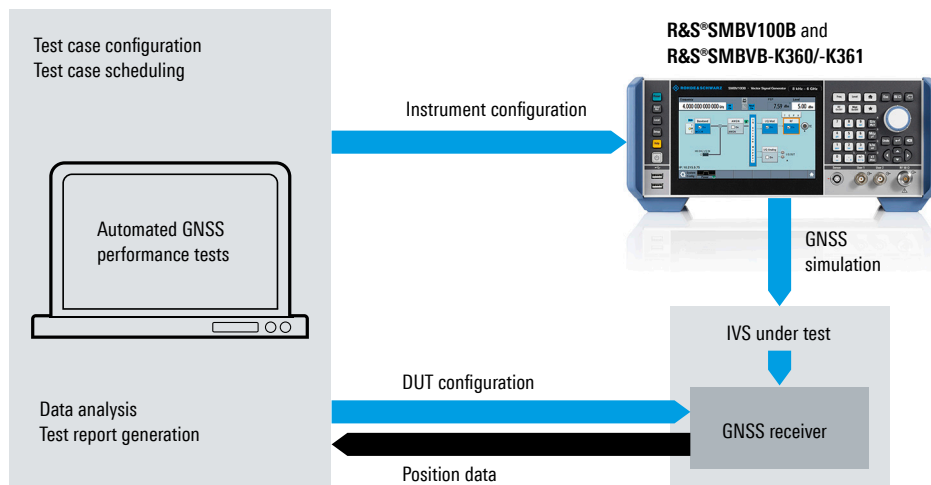
It generates GPS, GLONASS, Galileo, BeiDou, QZSS and SBAS signals on up to 24 channels. Versatile and flexible configuration options allow you to realize even complex GNSS scenarios. Both stationary and moving receivers can be easily simulated, as well as ionospheric and tropospheric influences and complex impairments in the receiver's environment, e.g. multipath propagation, shadowing and antenna characteristics.

The R&S®SMBVB-K361 option for eCall and the R&S®SMBVB-K360 option for ERA-GLONASS together with the R&S®CMWrun software turn the R&S®SMBV100B into an automatic GNSS performance test environment. This solution automatically configures both the signal generator and the connected GNSS receiver.

It tests the GNSS receiver against the performance criteria specified in (EU) 2017/79 Annex VI, UN-R 144 and GOST R 55534/GOST 33471 and provides complete test reports.

The R&S®CMW500 in combination with the R&S®CMW-KA094/-KA095 PSAP options and the R&S®SMBV100B is a powerful solution for functional and standard-compliant conformance and performance testing of your eCall and ERA-GLONASS modules in the lab or in a motor vehicle type approval test environment. Adding the R&S®CMWrun sequencer tool with the R&S®CMW-KT110 end-to-end conformance test package or the R&S®SMBVB-K360/-K361 GNSS performance test packages automates and significantly simplifies the complex and extensive test sequences for in-band modems and GNSS receivers. Easy upgradability makes these test instruments a future-ready investment, for example, to meet the upcoming test requirements of next generation eCall over LTE (NGeCall) systems and cellular V2X communications.

Automated GNSS performance testing for eCall and ERA-GLONASS modules



Supported standards for eCall and ERA-GLONASS

Core standards for eCall

- ▶ CEN EN 15722: eCall MSD
- ▶ CEN EN 16062: eCall high-level application requirements
- ▶ CEN EN 16072: pan-European eCall operating requirements
- ▶ CEN EN 16102: operating requirements for third-party support
- ▶ ETSI TS 126267: eCall data transfer, IBM solution, general description
- ▶ ETSI TS 126268: eCall data transfer, IBM solution, reference code

Test standards and test specifications for eCall

- ▶ CEN EN 16454: eCall end-to-end conformance testing
- ▶ ETSI TS 103412: pan-European eCall end-to-end and in-band modem conformance testing
- ▶ ETSI TS 126269: in-band modem conformance testing
- ▶ ETSI TS 103428: eCall H LAP interoperability testing
- ▶ ETSI TS 102936-1, ETSI TS 151010-1, ETSI TS 134123-1: GSM/UMTS conformance
- ▶ ITU-T P.1140: speech communication requirements for emergency calls

EU regulations for eCall

- ▶ EU 2015/758: type approval requirements for deployment of eCall
- ▶ EU 2017/78: administrative provisions for EC type approval
- ▶ EU 2017/79: test procedures for EC type approval (tests in annex I-VIII)

Test standards for ERA-GLONASS in Russia and customs union

- ▶ GOST R 5530, GOST 33467: functional test methods
- ▶ GOST R 55533, GOST 33470: test methods for GSM/UMTS modem and in-band modem
- ▶ GOST R 55534, GOST 33471: test methods for navigation module (GNSS)

See also

Product links:

www.rohde-schwarz.com/CMW

www.rohde-schwarz.com/product/SMBV100B

Automotive connectivity test solutions:

www.rohde-schwarz.com/automotive/connectivity

www.rohde-schwarz.com/automotive/eCall



The market-leading eCall test solution is based on the R&S®CMW500 platform in combination with the R&S®SMBV100B GNSS simulator and the R&S®CMW-KA094 PSAP simulation option.



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