

Guidance on emergency calling systems

The informal working group (GRE IWG EMC) is revising UN Regulation No. 10 and it has been agreed to include a vehicle level test for radiated immunity for emergency calling systems. However, there are some aspects of the test which are uncertain, and we are seeking guidance from GRSG on this matter.

There are some open questions including the definition of operating mode, appropriate test parameters, test environment and failure criteria for a repeatable emergency calling systems test. We would welcome comments, suggestions and contributions from the experts in the field of emergency calling systems from GRSG.

There are two main scenarios under discussion in GRE IWG-EMC:

- Emergency call triggered before and after immunity test:
- Emergency call triggered before, during and after immunity test

1- Emergency call triggered before and after immunity test:

<i>" emergency calling systems " vehicle test conditions</i>	<i>Failure criteria</i>
Emergency calling systems shall be tested (either by performing a manual or automatic triggering using an emulated or public network) before, and after performing tests defined in "50 km/h mode" or in "Brake mode" vehicle test conditions	Incorrect operation of emergency calling systems (incorrect transmission of MSD, incomprehensible audio connection, tell-tale default, ...)

This proposal does not require triggering of emergency calling systems in the presence of radiated disturbances for the reasons explained below:

The first concern regards dual certification; modems are already required by national or international regulations¹ to be certified to ETSI standards including EMC (verifying the ability to trigger an emergency calling systems in the presence of radiated disturbances). Introducing requirements in a different regulation which are conflicting with the primary specification will create further complications for all parties.

Additionally, vehicle and emergency calling systems equipment manufacturers are concerned that vehicle cellular modems, which utilise state of the art radio communications chipsets are not designed to operate under test severity defined in UN R10. Radiated Immunity test requirements for cellular communications equipment is 3V/m [²] whereas UN R10 asks for 30V/m [³]. If we were to proceed with the request to initiate an emergency calling systems during exposure to electromagnetic radiation

[1] Radio Equipment Directive 2014/53/EU

[2] 3GPP TS 36.124 V17.0.0 (2022-03) § 9.2.2 RF electromagnetic field

[3] ECE R10 §6.4 Specifications concerning immunity of vehicles to electromagnetic radiation

which is more severe, then there is a risk that the level of input power at the modem input could exceed the blocking characteristics defined in ETSI documents [4]. This could lead to failures which would jeopardise the development of dedicated radio communication chipsets for emergency calling systems with important consequences (cost, interruption of supply of emergency calling systems until such devices can be developed, etc.).

2a- Emergency call triggered before, during and after immunity test:

<i>" emergency calling systems " vehicle test conditions</i>	<i>Failure criteria</i>
<p>Emergency calling systems shall be tested (either by performing manual or automatic triggering using an emulated or public network) before, during (outside frequency band defined in clause 6.10.6) and after performing tests defined in "50 km/h mode" or in "Brake mode" vehicle test conditions</p> <p>The test during field irradiation shall be achieved by triggering an emergency call at each testing frequencies</p>	<p>Incorrect operation of emergency calling systems:</p> <ul style="list-style-type: none"> • incorrect transmission of MSD (Automatic activation, Test call, position can be trusted, vehicle type, VIN, vehicle propulsion storage type, Time stamp, Position latitude, Position longitude, Vehicle direction). • Incomprehensible audio connection • tell-tale default

This proposal requires verification of ability of the vehicle to trigger an emergency call in the presence of radiated disturbances, at each test frequencies.

Today, it is **possible** to acquire a test solution for testing an “emergency calling system” (e.g. Rohde & Schwarz, Anritsu and Keysight) **which should be** adapted to the vehicle EMC environment; and the MSD monitoring can be done more easily through commonly used EMC software (e.g. BAT EMC, EMC32)

These test solutions do not require modification of the emergency call number in the vehicle and are totally isolated from the public-safety answering point (PSAP).

The test equipment solutions are comparable in cost to specific test equipment used to generate radiated disturbances.

2b- Emergency call triggered before, during and after immunity test:

<i>" emergency calling systems " vehicle test conditions</i>	<i>Failure criteria</i>
<p>Emergency calling systems shall be tested (either by performing manual or automatic triggering using an emulated or public network) before, during (outside frequency band defined in clause 6.10.6) and after performing tests</p>	<p>Incorrect operation of emergency calling systems:</p> <ul style="list-style-type: none"> • incorrect transmission of MSD (Automatic activation, Test call, position can be trusted, vehicle type, VIN, vehicle propulsion storage

[4]TS 136 101 V17.5.0 (2022-05), Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception, § 7.6.1 In-band Blocking & § 7.6.2 Out-of-band Blocking

defined in "50 km/h mode" or in "Brake mode" vehicle test conditions	type, Time stamp, Position latitude, Position longitude, Vehicle direction).
The test during field irradiation shall be achieved by triggering and maintaining a single emergency call during the whole test	<ul style="list-style-type: none"> • Incomprehensible audio connection • tell-tale default

This proposal requires verification of ability of the vehicle to trigger an emergency calling systems, in the presence of radiated disturbances, with a single emergency call.

The main justification for proposals 2a and 2b is to test the worst-case scenario to ensure the safety-related function of emergency call systems.

There are some additional concerns regarding the following points:

- Manual or automatic triggering (vehicle set-up) call
 - Possible risks: An emergency call, if not adequately isolated during testing, can get through to the public-safety answering point (PSAP). If the emergency call number is changed for the purpose of testing, then problems may occur when resetting to factory settings.
- PSAP/emulated testing systems, GNSS and network mobile coverage inside EMC laboratory
 - Acquisition costs and functionality for such systems.