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UN Regulation No. 144 (Accident Emergency Call Systems)

Proposal for Guidance on Emergency Call Systems

Submitted by the expert from Germany *

The text reproduced below is prepared by the expert from Germany on behalf of the IWG on Electromagnetic Compatibility of the Working Party on Lighting and Light-Signalling (GRE IWG EMC) to get guidance from the Working Party on General Safety Provisions (GRSG) on some aspects of e-Call testing.

* In accordance with the programme of work of the Inland Transport Committee for 2022 as outlined in the proposed programme budget for 2022 (A/76/6, part V, sect. 20, para. 20.76), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.



I. Proposal

Guidance on Emergency Call Systems

1. The experts of GRE IWG EMC are revising UN Regulation No. 10 and have 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 the IWG is seeking guidance from GRSG on this matter.
2. Some open questions include the definition of the 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 of GRSG.
3. There are two main scenarios under discussion in GRE IWG EMC:
 - (a) Emergency call triggered before and after immunity test (see Table 1);
 - (b) Emergency call triggered before, during and after immunity test (see Tables 2a and 2b).

Table 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 reception of the Minimum Set of emergency-related Data (MSD), incomprehensible audio connection, tell-tale default, ...)

4. This proposal does not require triggering of an e-emergency calling systems in the presence of radiated disturbances for the reasons explained below:
 - (a) The first concern regards dual certification: modems are already required by national or international regulations¹ to be certified to the European Telecommunications Standards Institute (ETSI) standards including EMC (verifying the ability to trigger an emergency calling systems in the presence of radiated disturbances). Introducing requirements in a different UN Regulation which conflict with the primary specification would create further complications for all parties.
 - (b) 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 the test severity defined in UN Regulation No. 10. Radiated Immunity test requirements for cellular communications equipment is 3V/m^[2] whereas UN Regulation No. 10 asks for 30V/m^[3]. If we were to proceed with the request to initiate an emergency calling systems during exposure 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 documents⁴. This could lead to failures which would jeopardise the development of dedicated radio communication chipsets for emergency calling systems with important consequences

¹ Radio Equipment Directive 2014/53/EU.

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

³ UN Regulation No. 10, para. 6.4: Specifications concerning immunity of vehicles to electromagnetic radiation.

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

(cost, interruption of supply of emergency calling systems until such devices can be developed, etc.).

Table 2a

Emergency Call Triggered Before, During 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 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.	Incorrect operation of emergency calling systems: incorrect reception of MSD (automatic activation, test call, position can be trusted, vehicle type, Vehicle Identification Number (VIN), vehicle propulsion storage type, time stamp, position latitude, position longitude, vehicle direction).
The test during field irradiation shall be achieved by triggering an emergency call at each testing frequencies.	Incomprehensible audio connection. Tell-tale default.

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

6. Today, it is easy to acquire a test solution for testing an "emergency calling system" (e.g. Rohde and Schwarz, Anritsu and Keysight) 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).

7. 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).

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

Table 2b

Emergency Call Triggered Before, During 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 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.	Incorrect operation of emergency calling systems: incorrect reception 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).
The test during field irradiation shall be achieved by triggering and maintaining a single emergency call during the whole test.	Incomprehensible audio connection. Tell-tale default.

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

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

11. Additional concerns are:

- (a) 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.

- (b) PSAP/emulated testing systems, Global Navigation Satellite System, and network mobile coverage inside an EMC laboratory:

Acquisition costs and functionality for such systems.

II. Justification

GRE IWG EMC agreed to include a vehicle level test for radiated immunity for emergency calling systems in UN Regulation No. 10. Some aspects of the test remain uncertain, and guidance from GRSG is needed. For this purpose, the working document is on the agenda.
