

Task Force on Electro-Magnetic Compatibility (TF-EMC)

**Status report to GRSG-117
Proposal for updated R116 EMC annexes
Thursday, 8th of October 2018**

GRE TF-EMC Status Report – UN R116 Development

- GRE TF-EMC has been asked by WP29 to support GRSG work on new UN R116 draft Regulations for the EMC topic.
- TF-EMC has analyzed the EMC annex 9 of previous UN R116 and issued some proposals for revision of EMC annexes of :
 - **ECE/TRANS/WP.29/GRSG/2019/20** - (OICA) Proposal for a draft new UN Regulation on Devices Against Unauthorized Use
 - **ECE/TRANS/WP.29/GRSG/2019/21** - (OICA) Proposal for a new UN Regulation on uniform technical prescriptions concerning approval of immobilizers and approval of a vehicle with regard to its immobilizer
 - **ECE/TRANS/WP.29/GRSG/2019/22** - (OICA) Proposal for a draft new UN Regulation on Uniform provisions concerning the approval of vehicle alarm system and approval of a vehicle with regard to its vehicle alarm system.

GRE TF-EMC Status Report – UN R116 Development

UN R116 EMC annex 9 included two alternative methods :

“Method ISO”

“Method IEC”



Proposal that EMC annexes of the 3 new regulations include a single method (based on previous Method ISO)

Justification : Deletion of the alternative « Method IEC » due to the fact that test described in this part were either a duplication of those in “Method ISO” or reference to test which are no more state of the art.

~~Note: To test the electromagnetic compatibility, either paragraph 1. or paragraph 2. shall be used, depending on the test facilities.~~

1. METHOD ISO

Immunity against disturbances conducted along supply lines

Apply the test pulses 1, 2, 3a, 3b, 4 and 5 according to the International Standard ISO 7637-1:1990 to the supply lines as well as to other connections of VAS/AS which may be operationally connected to supply lines.

VAS/AS in unset state

The test pulses 1 through 5, shall be applied with a degree of severity III. The required functional status for all applied test pulses shall be A.

2. METHOD IEC

Electromagnetic field

The VAS/AS shall undergo the basic test. It shall be subjected to the electromagnetic field test described in IEC Publication 839-1-3-1998 test A-13 with a frequency range from 20 to 1000 MHz, and for a field strength level of 30 V/m.

In addition, the VAS/AS shall be subjected to the electrical transient conducted and coupled tests described in the International Standard ISO 7637 Parts 1:1990, 2:1990 and 3:1995, as appropriate.

Electrical disturbance from electrostatic discharges

The VAS/AS shall undergo the basic test. It shall be subjected to testing for immunity against electrostatic discharge as described in either EN 61000-4-2, or ISO/TR 10605:1993, at the manufacturer's choice.

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UN R116 EMC : “Immunity against disturbances conducted along supply lines”



Proposal to simplify wording (reference to UN R10.06) and to be up-to-date (suppression of pulse 5)

Justification : same test is described in UN R10 annex 10 and in UN R10 which is considered as the EMC state of the art pulse 5 is not required.

Immunity against disturbances conducted along supply lines

Apply the test pulses 1, 2, 3a, 3b, 4 and 5 according to the International Standard ISO 7637-1:1990 to the supply lines as well as to other connections of VAS/AS which may be operationally connected to supply lines.

VAS/AS in unset state

The test pulses 1 through 5 shall be applied with a degree of severity III. The required functional status for all applied test pulses shall be A.

VAS/AS in set state

The test pulses 1 through 5 shall be applied. The required functional status for all applied test pulses are given in table 1.

Table 1 – Severity/functional status (for supply lines)

Test pulse number	Test level	Functional status
1	III	C
2	III	A
3a	III	C
3b	III	A
4	III	B
4	I	A
5	III	A

“1.1. Immunity against disturbances conducted along supply lines

Tests shall be performed according to the technical prescriptions and transitional provisions of Regulation No. 10.06 series of amendments and according to the test methods described in Annex 10 for an Electrical/Electronic Sub-Assembly (ESA).

The device against unauthorized use shall be tested in unset state and in set state.

GRE TF-EMC Status Report – UN R116 Development

UN R116 EMC : “Immunity against disturbances coupled on signal lines”



Proposal to suppress this test which is not required in UN R10
Justification : this test of immunity against disturbance coupled on signal lines is not representative of a real misuse-case (in terms of coupling device used in vehicle and/or discrimination of signal lines in whole vehicle harnesses).

Immunity against disturbance coupled on signal lines

Leads which are not connected to supply lines (e.g. special signal lines) shall be tested in accordance with the International Standard ISO7637-3:1995 (and Corr.1). The required functional status for all applied test pulses are given in table 2.

Table 2 – Test level / functional status (for signal lines)

Test pulse number	Test level	Functional status
3a	III	C
3b	III	A

GRE TF-EMC Status Report – UN R116 Development

UN R116 EMC : “Immunity against radiated high frequency disturbances”



Proposal to update UN R10 reference (to UN R10.06) and to add a table with precision on operating conditions and failure criteria (both for vehicle and bench test).
Justification : to be in line with last UN R10 and to allow more consistency between the technical services regarding test conditions and failure criteria.

~~Immunity against radiated high frequency disturbances~~
~~Testing of the immunity of a VAS/AS in a vehicle may be performed according to the prescriptions in Regulation No. 10, 02 series of amendments and test methods described in Annex 6 for the vehicles and Annex 9 for a separate technical unit.~~

“1.2. Immunity against radiated high frequency disturbances
 Testing of the immunity of a device **against unauthorized use** in a vehicle may be performed according to the technical prescriptions and transitional provisions of UN Regulation No. 10, 06 series of amendments and test methods described in Annex 6 for the vehicles or Annex 9 for an **Electrical/Electronic Sub-Assembly (ESA)**.
The device against unauthorized use shall be tested with operating conditions and failure criteria as defined in table 1

Test type	Device against unauthorized use operating conditions	Failure criteria
Vehicle test	Device against unauthorized use in unset state Key ON or Vehicle at 50 km/h ⁽¹⁾	Unexpected activation of the device against unauthorized use
	Device against unauthorized use in set state Key OFF	Unexpected deactivation of the device against unauthorized use
	Device against unauthorized use in set state Vehicle in charging mode (if applicable)	Unexpected deactivation of the device against unauthorized use
ESA Test	Device against unauthorized use in unset state	Unexpected activation of the device against unauthorized use
	Device against unauthorized use in set state	Unexpected deactivation of the device against unauthorized use

(1) : this test can be covered by the ECE R10 50 km/h mode

Table 1 – Operating conditions and failure criteria for device against unauthorized use”

GRE TF-EMC Status Report – UN R116 Development

UN R116 EMC : “Electrical disturbance from electrostatic discharges”



Proposal to update to last version of ISO 10605 (2008) and to add a table with precision on test conditions, test levels and operating conditions and failure criteria (both for vehicle and bench test).
Justification : to be in line with last ISO standard and to allow more consistency between the technical services regarding test conditions (levels and criteria).

~~Electrical disturbances from electrostatic discharges~~
~~Immunity against electrical disturbances shall be tested in accordance with Technical Report ISO/TR 10605-1993~~

Electrical disturbance from electrostatic discharges
 Immunity against electrical disturbances shall be tested in accordance with ISO 10605 2008 + corrigendum:2010 + AMD1:2014 using the test severity levels from table 2.
 ESD tests shall be performed either at vehicle level or at Electrical/Electronic Sub-Assembly (ESA) level.

Discharge type	Discharge points	Device against unauthorized use state	Discharge network	Test Level	Failure criteria
Air discharge	Points that can easily be accessed only from the inside of the vehicle	Device against unauthorized use in unset state (if test performed on vehicle then vehicle shall be Key ON or Vehicle at 50 km/h or engine in idle mode)	330 pF, 2 kΩ	± 6 kV	Unexpected activation of the device against unauthorized use
	Points that can easily be touched only from the outside of the vehicle	Device against unauthorized use in set state (if test performed on vehicle then vehicle shall be locked and Key OFF)	150 pF, 2 kΩ	± 15 kV	Unexpected deactivation of the device against unauthorized use without reactivation, within 1s, after each discharge
Contact discharge	Points that can easily be accessed only from the inside of the vehicle	Device against unauthorized use in unset state (if test performed on vehicle then vehicle shall be Key ON or Vehicle at 50 km/h or engine in idle mode)	330 pF, 2 kΩ	± 4 kV	Unexpected activation of the device against unauthorized use
	Points that can easily be touched only from the outside of the vehicle	Device against unauthorized use in set state (if test performed on vehicle then vehicle shall be locked and Key OFF)	150 pF, 2 kΩ	± 8 kV	Unexpected deactivation of the device against unauthorized use without reactivation, within 1s, after each discharge

Each test shall be performed with 3 discharges with a minimum of 5 s interval between each discharge

Table 2 – ESD Test levels”

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R116 EMC : “Radiated emissions”



Proposal to update UN R10 reference (to UN R10.06) and to add a sentence with precision on operating conditions.

Justification : to be in line with last ISO standard and to allow more consistency between the technical services regarding test levels and test conditions.

Radiated emissions

~~Tests shall be performed according to Regulation No. 10, 02 series of amendments prescriptions and according to the test methods described in annexes 4 and 5 for vehicles or annexes 7 and 8, for a separate technical unit.~~

Radiated emissions

Tests shall be performed according to the technical prescriptions and transitional provisions of UN Regulation 10, 06 series of amendments prescriptions and according to the test methods described in Annexes 4 and 5 for vehicles or Annexes 7 and 8, for an Electrical/Electronic Sub-Assembly (ESA).

The device against unauthorized use shall be in set state.”

Thank you for your attention