

## **Proposal for Supplement 1 to the 05 series of amendments to Regulation No. 10 (Electromagnetic compatibility)**

The text reproduced below was prepared by the expert from the International Organization of Motor Vehicle Manufacturers (OICA), to propose amendments to ECE/TRANS/WP.29/2013/73. It supersedes GRE/2013/41. The modifications to document ECE/TRANS/WP.29/WP29/2013/73 are marked in bold for new or strikethrough for deleted characters

### **I. Proposal**

*Paragraph 4.2.4*, shall be deleted:

~~"4.2.4. In case an ESA is (part of) a light source and if:~~  
~~(a) this ESA is subject to approval according to Regulation No. 37, Regulation No. 99 or Regulation No. [128]; and/or,~~  
~~(b) this ESA is mechanically interchangeable with any (replaceable) approved light source according to Regulation No. 37, Regulation No. 99 or Regulation No. [128];~~  
~~then approval according to Regulation No. 10 shall be refused if no approval according to Regulation No. 37, Regulation No. 99 or Regulation No. [128] was granted."~~

*Paragraph 6.7.1., Table 1*, amend to read (inserting the unit "V"):

"Table 1

Maximum allowed pulse amplitude

Polarity of pulse amplitude	<i>Maximum allowed pulse amplitude for</i>	
	Vehicles with 12 V systems	Vehicles with 24 V systems
Positive	+75 V	+150 V
Negative	-100 V	-450 V

*Paragraph 7.5.2.2.*, amend to read:

"7.5.2.2. If measurements are made using the method described in Annex 13, the limits on DC power lines are those defined in IEC 61000-6-3 (edition 2.0 2006) and given in Table 408 8."

*Paragraph 7.15.2.2.*, amend to read:

"7.15.2.2. The ESA representative of its type shall be considered as complying with immunity requirements if, during the tests performed in accordance with Annex 45-21, there shall be no degradation of performance of "immunity related functions", according to paragraph 2.2. of Annex 9."

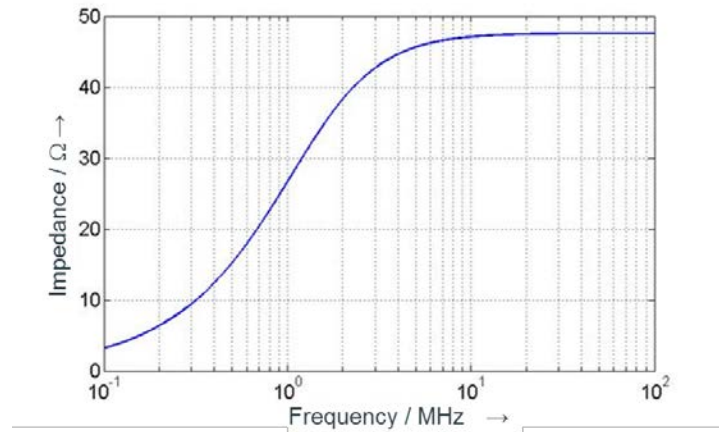
*Paragraph 7.17.1., Table 17*, amend to read (inserting the unit "V")

<i>Polarity of pulse</i>	<i>Maximum allowed pulse amplitude for</i>
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<i>amplitude</i>	<i>Vehicles with 12 V systems</i>	<i>Vehicles with 24 V systems</i>
Positive	+75 V	+150 V
Negative	-100 V	-450 V

Appendix 8, figure 2, delete and replace by:

**"Figure 2  
Impedance of HV artificial network**



Annex 4, Table 1 and Annex 5, Table 1, as well as Annex 7, Table 1, the note amend to read:

"Note: If a spectrum **analyser**"

Annex 5, paragraph 1.2, amend to read:

1.2. Test method

This test is intended to measure the narrowband electromagnetic emissions ~~such as might~~ **that may** emanate from microprocessor-based systems or other narrowband source.

If not otherwise stated in this annex the test shall be performed according to CISPR 12 **or to CISPR 25.**

Annex 7, paragraph 4.4., amend to read:

"4.4. Measurements

Unless otherwise specified the configuration with the LV harness closer to the antenna shall be tested.

The phase centre of the antenna shall be in line with the centre of the longitudinal part of the wiring harnesses for frequencies up to 1,000 MHz.

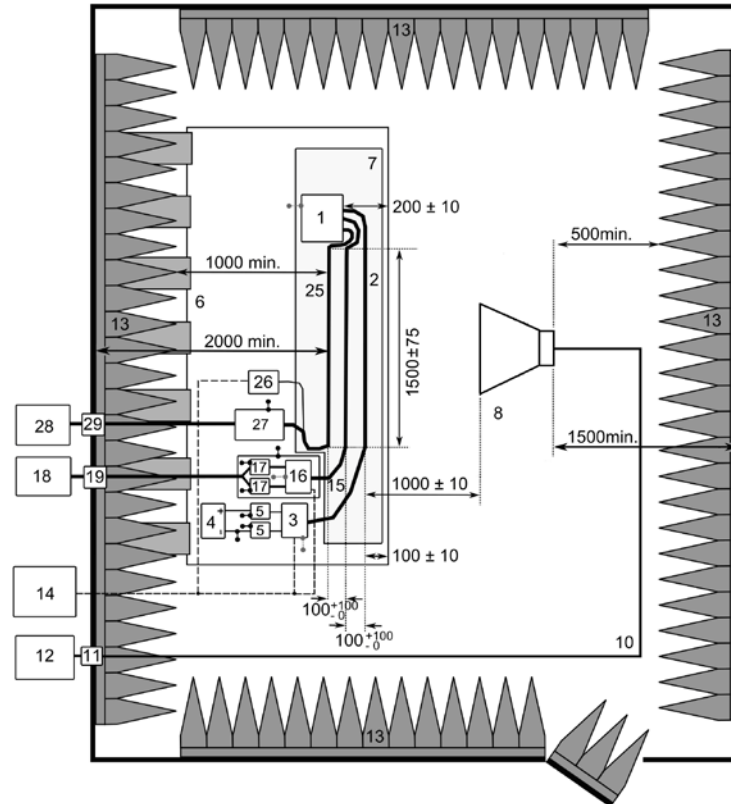
~~The phase centre of the antenna for frequencies above 1'000 MHz shall be in line with the ESA."~~

Annex 8, Table 1 and Annex 13, Table 1 and Annex 14, Table 1 and Annex 19, Table 1, and Annex 20, Table 1, the note amend to read:

"Note: ~~If a spectrum~~ **If a spectrum analyser**"

Annex 9, Appendix 3, figure, to be replaced:

Top view (Vertical polarization)



Annex 9, Appendix 3, Legend, amend to read:

"Legend

- |   |                                      |
|---|--------------------------------------|
| 1 ESA (grounded locally if required in test plan)   | 13 RF absorber material              |
| 2 LV Test harness   | 14 Stimulation and monitoring system |
| 3 LV Load simulator (placement and ground connection according to CISPR 25 paragraph 6.4.2.5) | 15 HV harness                        |
| 4 Power supply (location optional)  | 16 HV load simulator                 |
| 5 LV Artificial network (AN)  | 17 HV AN                             |
| 6 Ground plane (bonded to shielded enclosure)   | 18 HV power supply                   |
| 7 Low relative permittivity support ( $\epsilon_r \leq 1,4$ )                                 | 19 HV feed-through                   |
| 8 <del>Biconical</del> <b>Horn</b> antenna  | 25 AC/DC charger harness             |
| 10 High-quality coaxial cable e.g. double-shielded (50 $\Omega$ )                             | 26 AC/DC load simulator (e.g. PLC)   |
| 11 Bulkhead connector   | 27 50 $\mu$ H LISN (AC) or HVAN (DC) |
| 12 RF signal generator and amplifier  | 28 AC/DC power supply                |
|   | 29 AC/DC feed-through                |

"

Annex 9, Appendix 4, amend to read:

"Top view (~~horizontal polarization~~) (example of substitution method)"

Annex 11 paragraph 2.1, amend to read:

- "2.1. The vehicle shall be in configuration "REESS charging mode coupled to the power grid".

The state of charge (SOC) of the traction battery shall be kept between 20 per cent and 80 per cent of the maximum SOC ~~during the whole frequency range measurement (this may lead to split the measurement in different sub-bands with the need to discharge the vehicle's traction battery before starting the next sub-bands)~~ **during the whole time duration of the measurement (this may lead to the measurement being split into different time slots with the need to discharge the vehicle's traction battery before starting the next time slot)**. If the current consumption can be adjusted, then the current shall be set to at least **80** per cent of its nominal value."

Annex 11, paragraph 3.1., amend to read:

"3.1. The observation time to be used for the measurements shall be as for quasi-stationary equipment as defined in IEC 61000-3-2, Table ~~34~~."

Annex 12, para. 2.1, amend to read:

"2.1. The vehicle shall be in configuration "REESS charging mode coupled to the power grid".

The state of charge (SOC) of the traction battery shall be kept between 20 per cent and 80 per cent of the maximum SOC ~~during the whole frequency range measurement (this may lead to split the measurement in different sub-bands with the need to discharge the vehicle's traction battery before starting the next sub-bands)~~ **during the whole time duration of the measurement (this may lead to the measurement being split into different time slots with the need to discharge the vehicle's traction battery before starting the next time slot)**. If the current consumption can be adjusted, then the current shall be set to at least 80 per cent of its nominal value

Annex 13, paragraph 3.3., amend to read:

"3.3. The test set-up for the connection of the vehicle in configuration "REESS charging mode coupled to the power grid" is shown in figure ~~11a to 1d~~ of the appendix to this Annex."

Annex 13, paragraph 4.2., amend to read:

"4.2. Measurements shall be performed with average and either quasi-peak or peak detectors. The limits are given in paragraph 7.5.

Table 7 for AC lines and Table 8 for DC lines. If peak detectors are used a correction factor of 20 dB as defined in CISPR ~~12~~ shall be applied."

Annex 15 paragraph 2.1.2, Annex 16 paragraph 2.1.2, amend to read:

"2.1.2 ....

<i>" REESS charging mode" vehicle test conditions</i>	<i>Failure criteria</i>
<p>The REESS shall be in charging mode. The <del>SOC</del> <b>state of charge (SOC)</b> of the traction battery shall be kept between 20 per cent and 80 per cent of the maximum SOC <del>during the whole frequency range measurement (this may lead to split the measurement in different sub-bands with the need to discharge the vehicle's traction battery before starting the next sub-bands).</del> <b>during the whole time duration of the measurement (this may lead to the measurement being split into different time slots with the need to discharge the vehicle's traction battery before starting the next time slot)</b>. If the current consumption can be adjusted, then the current shall be set to at least 20 per cent of its nominal value</p>	<p>Vehicle sets in motion</p>

*Annex 17 paragraph 2.1., Annex 18 paragraph 2.1., amend to read:*

"2.1. The ESA shall be in configuration "REESS charging mode coupled to the power grid".

The state of charge (SOC) of the traction battery shall be kept between 20 per cent and 80 per cent of the maximum SOC ~~during the whole frequency range measurement (this may lead to split the measurement in different sub bands with the need to discharge the vehicle's traction battery before starting the next sub bands)~~ **during the whole time duration of the measurement (this may lead to the measurement being split into different time slots with the need to discharge the vehicle's traction battery before starting the next time slot).**

~~If the test is not performed with a REESS the ESA should be tested at rated current. If the current consumption can be adjusted, then the current shall be set to at least 80 per cent of its nominal value."~~

*Annex 19, paragraph 3.2., amend to read:*

"3.2. The artificial mains network to be used for the measurement on vehicle components is defined in clause 4.3. of CISPR 16-1-2.

Artificial networks

The AN(s) shall be mounted directly on the ground plane. The cases of the AN(s) shall be bonded to the ground plane.

~~The measuring port of each AN shall be terminated with a 50 Ω load.~~

**The conducted emissions on AC and DC power lines are measured successively on each power line by connecting the measuring receiver on the measuring port of the related AN, the measuring port of the AN inserted in the other power lines being terminated with a 50 Ω load.**

The AN shall be placed in front, aligned and on the same side of the vehicle power charging plug.

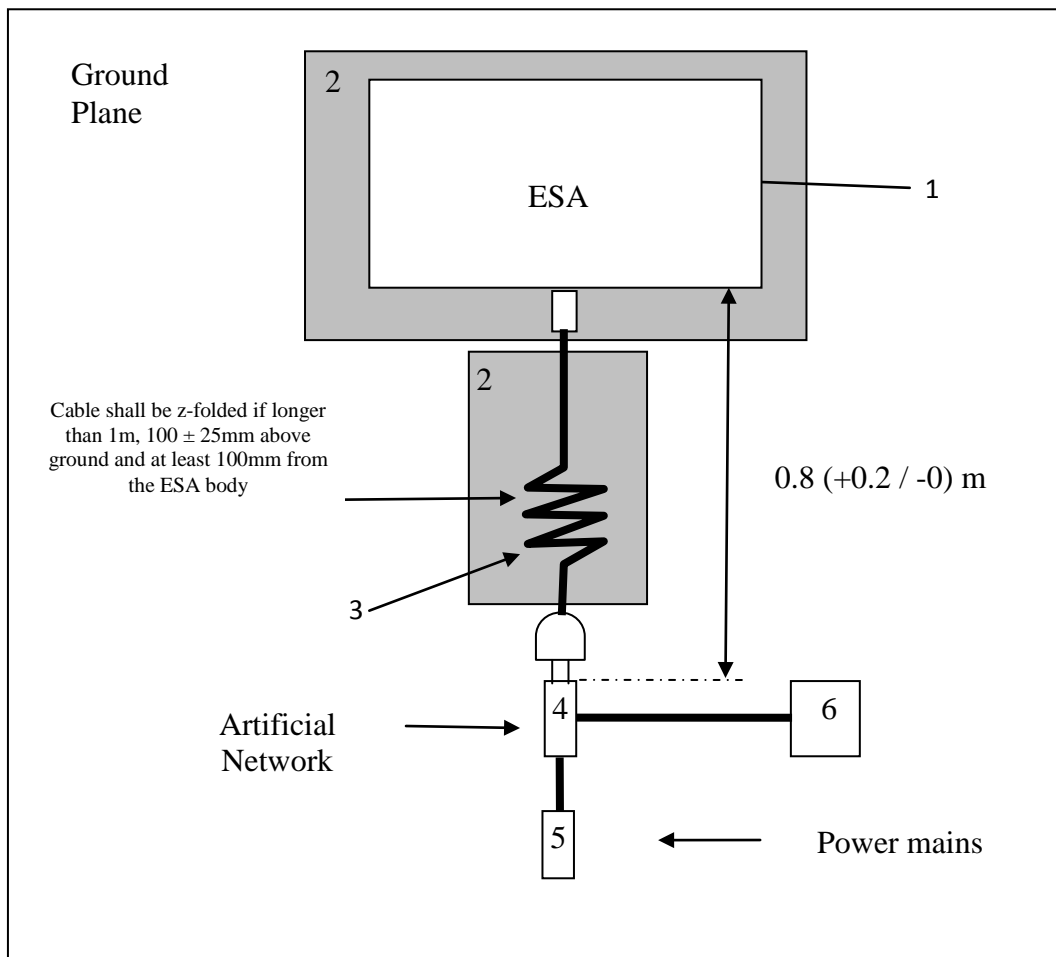
*Annex 19, paragraph 3.3., amend to read:*

"3.3. The test set-up for the connection of the ESAs in configuration "REESS charging mode coupled to the power grid" is shown in ~~Figure 2~~ **Figure 1** of Appendix 1 to this annex."

*Annex 19, Appendix, Figure 1, amend to read:*

"Figure 1

ESA in configuration "REESS charging mode coupled to the power grid"



Annex 20, paragraph 3.1., amend to read:

"3.1. The test set-up shall be performed according to paragraph 5- 8 and 9 of CISPR 22 for conducted emissions."

Annex 20, paragraph 3.2., amend to read:

"3.2. ~~The impedance stabilization to be used for the measurement on ESA is defined in CISPR 22, paragraph 9.6.2.~~

Impedance Stabilization

Communication lines shall be applied to the ~~vehicle~~ ESA through IS(s).

The impedance stabilization (IS) to be connected in the network and communication cables is defined in CISPR 22 paragraph 9.6.2.

The IS(s) shall be mounted directly on the ground plane. The case of the IS(s) shall be bonded to the ground plane.

~~The measuring port of each IS shall be terminated with a 50 Ω load.~~

**The conducted emissions on network and telecommunication lines are measured successively on each line by connecting the measuring receiver on the measuring port of the related IS, the measuring port of the IS inserted in the other lines being terminated with a 50 Ω load.**

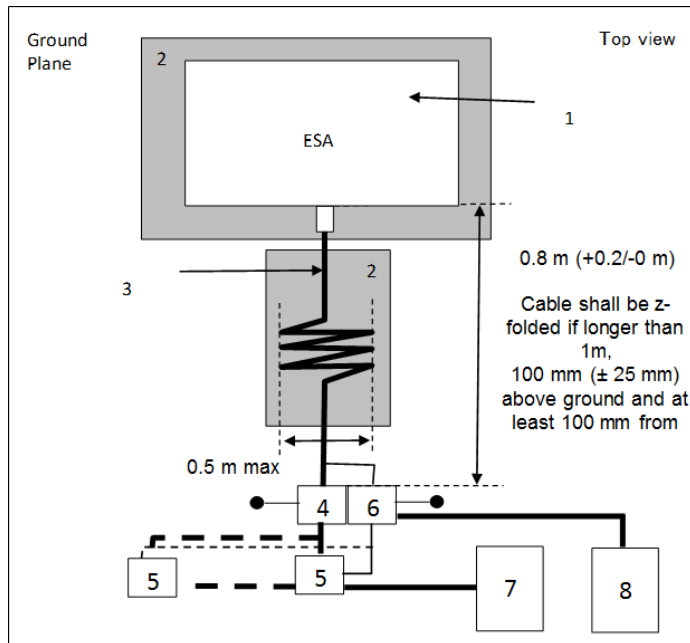
The IS shall be placed in front, aligned and on the same side of the vehicle power charging plug."

Annex 20, paragraph 3.5., renumber to paragraph 3.4.

Annex 20, Table 2, amend to read:

"Note: ~~For emissions generated by brush commutator motors without an electronic control unit, the maximum step size may be increased up to 5 times the bandwidth.~~"

Annex 20, Appendix, Figure 1, delete and replace by:



Legend: amend to read:

- 1 ESA under test
- 2 Insulating support
- 3 Charging / communication cable
- 4 AC or DC Artificial Network(s) grounded
- 5 Power mains socket
- 6 Impedance Stabilization(s) grounded
- 7 Charging Station
- 8 Measuring receiver**

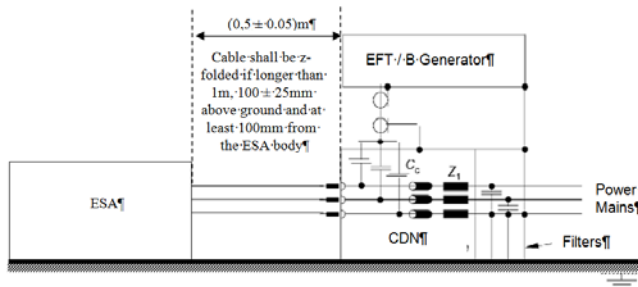
Annex 21 paragraph 2.1., Annex 22 paragraph 2.1.2, amend to read:

"2.1. Basic ESA conditions

The paragraph defines minimum test conditions (as far as applicable) and failures criteria for ESA immunity tests.

<b>"REESS charging mode" ESA test conditions</b>	<b>Failure criteria</b>
<p>ESA shall be in configuration "REESS charging mode coupled to the power grid".</p> <p>The state of charge (SOC) of the traction battery shall be kept between 20 per cent and 80 per cent of the maximum SOC <del>during the whole frequency range measurement (this may lead to split the measurement in different sub-bands with the need to discharge the vehicle's traction battery before starting the next sub-bands)</del> <b>during the whole time duration of the measurement (this may lead to the measurement being split into different time slots with the need to discharge the vehicle's traction battery before starting the next time slot).</b></p> <p><del>If the test is not performed with a REESS the ESA should be tested at rated current.</del> If the current consumption can be adjusted, then the current shall be set to at least 20 per cent of its nominal value.</p>	<p>Incorrect charging condition (e.g. over-current, overvoltage)</p>

Annex 21, Appendix, Figure 1, delete and replace by:



Annex 21, Appendix, Figure 1, amend to read:

- "Legend
- 1 — ESA under test
  - 2 — Insulating support
  - 3 — Charging / communication cable
  - 4 — AC or DC Artificial Network(s) grounded
  - 5 — Power mains socket
  - 6 — Impedance Stabilization(s) grounded
  - 7 — Charging Station"

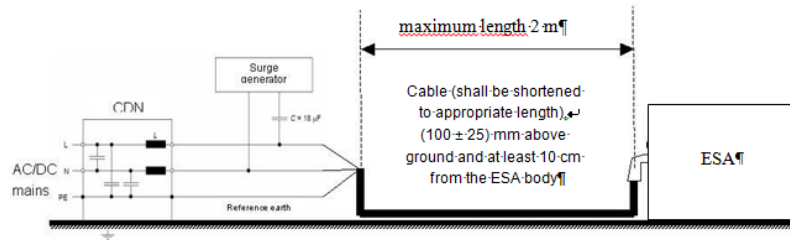
Annex 22, paragraph 4.3., amend to read:

"4.3 The Technical Service shall perform the test as specified in paragraph 7.8.2.1 7.16.2.1."

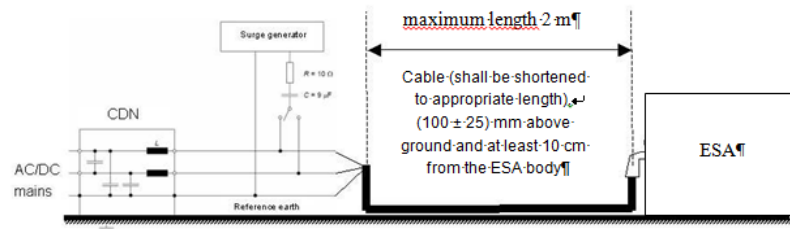


Annex 22, Appendix, Figures 1-4, amend to read:

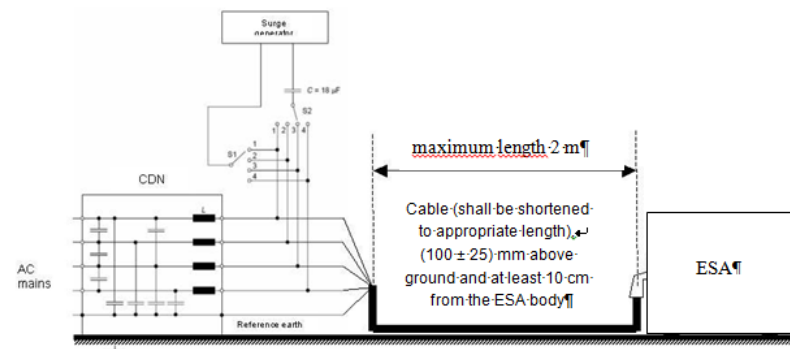
**"Figure 1**  
**ESA in configuration "REESS charging mode coupled to the power grid" - Coupling**  
**between lines for DC or AC (single phase) power lines.**



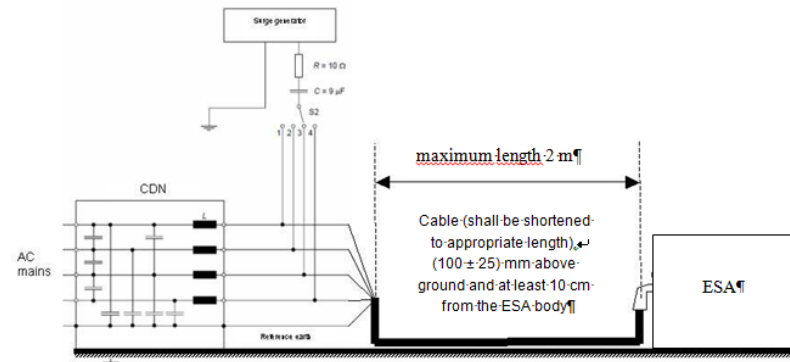
**Figure 2**  
**ESA in configuration "REESS charging mode coupled to the power grid" - Coupling**  
**between each line and earth for DC or AC (single phase) power lines**



**Figure 3**  
**ESA in configuration "REESS charging mode coupled to the power grid" - Coupling**  
**between lines for AC (three phases) power lines**



**Figure 4**  
**ESA in configuration "REESS charging mode coupled to the power grid" - Coupling**  
**between each line and earth for AC (three phases) power lines**



## II. Justification

### A) General

At its 69th session GRE agreed document GRE/2013/3 and Corr.1 from OICA together with additional amendments, as draft 05 series of amendments to Regulation No. 10 (GRE/69, paragraph 33). This has since become WP.29/2013/73, which was submitted to WP.29 and AC.1 for consideration at their November 2013 sessions as draft 05 series of amendments to Regulation No. 10.

GRE also agreed to resume consideration of an additional proposal from OICA (GRE-69-26 Rev.1) on the basis of a revised document that the expert from OICA volunteered to prepare for the October 2013 session of GRE. This document has since become GRE/2013/41.

In the meantime OICA experts have reviewed WP.29/2013/73 as well as GRE/2013/41, and have prepared a revised set of amendments of WP.29/2013/73 which is contained in the present document and which supersedes GRE/2013/41.

### B) Justification of individual proposals

1. Paragraph 4.2.4.: Regulation No. 10 concerns the electronic compatibility of all electronics systems included in vehicles or ESA. The problem raised by IEC in their informal document GRE-68-08 (and included in ECE/TRANS/WP.29/GRE/2013/3) has not been solved and cannot be solved by Regulation No. 10. In fact to do so, one should specify all existing regulation concerning equipment (ESA) in Regulation No. 10 (examples UN Regulations Nos. 13-H and 13 for braking systems, European directive No. 72/2010 in Europe for defrosting/defogging systems, UN Regulation No. 48 for lighting systems, UN Regulation No. 34 for prevention of fire risk regarding the charge dissipation, etc.). The aim of UN Regulation No. 10 is not to protect any industry or to complement a lack of any Technical Services or Administrations whose task is, among others, to verify the respect of the parallel regulatory texts such as UN Regulations Nos. 37, 99, 127, 13H, 13, 48, 34, etc.

2. First of all, in paragraph 4.2.4.a. of GRE-68-08, it is not explained how the applicant for the type-approval could demonstrate that the mentioned ESA was already approved according to Regulation No. 37, Regulation No. 99 or Regulation No. [128] and how the authorities could verify it.

3. Furthermore, in paragraph 4.2.4.b. of GRE-68-08, the EMC test-house is required to check that the mentioned ESA is not mechanically interchangeable with any (replaceable) approved light source according to Regulation No. 37, Regulation No. 99 or Regulation No. 128. An EMC test-house cannot possibly verify such a requirement.

4. In addition, in case of Contracting Parties not mandating Regulations Nos. 37, 99 or 128 in their national legislation, any industry should also comply with Regulations No. 37, No. 99 or No. 128 in addition to Regulation No. 10. It is not the role of any UN Regulation, notably UN Regulation No. 10, to create barrier to trade. Consequently, the justification given by IEC in their informal document GRE-68-8 is not meaningful and is in conflict with the first purpose of Regulation No. 10: to verify the design for all electronic systems in regard to their electronic compatibility. This explains why OICA proposes to delete paragraph 4.2.4.

5. Appendix 8: The value of the resistor  $R_2$  shall be increased from 100 k $\Omega$  to 1 M $\Omega$  because, if the value of this resistor is too low, the isolation protection circuit of a tested high voltage device could be activated and switch off the high voltage system under test. Generally, REESS HV line isolated to the ground or vehicle body by 1M ohm or more to

reduce the touch current. R2: 100k ohm in HVAN (High Voltage Artificial Network) will cause some leakage of current from HV lines. A certain level of leakage current will activate the fail-safe function which shut down the HV lines between REESS and HV power module. R2: resistance to the ground earth should apply 1M ohm which is equivalent value to insulation resistance of HV lines of REESS. This HVAN is applied in ESA immunity function test. To confirm the immunity performance in ESA, HVAN should keep the equivalent insulation resistance condition to vehicle test.

6. Appendix 8, figure 2, HV artificial network: editorial correction, from German to English nomenclature.
7. Para. 7.15.2.2.: editorial correction; this clause should refer the ESA Annex.
8. Annex 15: Method of testing for immunity of vehicles
9. Annex 21: Method of testing for immunity of an ESA.
10. Annex 4 Table 1, Annex 5 Table 1, Annex 7 Table 1, Annex 8 Table 1, Annex 13 Table 1, Annex 14 Table 1, Annex 19 Table 1, Annex 20 Table 1: editorial correction; word “analyser” was missing.
11. Annex 7, para. 4.4.: editorial correction; an unnecessary sentence was deleted. Test frequency is below the 1000MHz.
12. Annex 9, Appendix 3: Figure had to be improved because vertical polarization is applied in this regulation. Vertical layout figure should thus be applied in this annex. In vertical layout figures, a horn antenna figure would be better and easier for recognizing the antenna polarization compared with bi-conical antenna in figures.
13. Annex 9, Appendix 4: editorial correction.
14. Annex 11 para. 2.1 : editorial correction. Change in the sentence concerning “measurement split” from “sub-bands” to “time slots”. Moreover, the missing figure "80" was added.
15. Annex 12 para. 2.1.: editorial correction. Change in the sentence concerning “measurement split” from “sub-bands” to “time slots”.
16. Annex 15 para. 2.1.2, Annex 16 para. 2.1.2.: editorial correction. Change in the sentence concerning “measurement split” from “sub-bands” to “time slots”. Moreover change of second sentence (meaning of SOC).
17. Annex 11, para. 3.1.: editorial correction, since a wrong table was referred to.
18. Annex 13, para. 13.3.: editorial correction; missing "a to 1d".
19. Annex 17 para. 2.1., Annex 18 para. 2.1.: editorial correction. Unnecessary sentences were deleted.
20. Annex 19 para. 3.2.: editorial correction. Precision concerning what should be connected to the AN measuring port.
21. Annex 19, Table 2: editorial correction; an unnecessary sentence was deleted.
22. Annex 20 para. 3.2.: editorial correction. Suppression or redundant sentence and precision concerning what should be connected to the IS measuring port. Moreover replacement of “Vehicle” by “ESA”
23. Annex 21 para. 2.1., Annex 22 para. 2.1.2: editorial correction. Unnecessary sentence was deleted. This sentence was wrongly copied and pasted from Annex 12, 13.
24. The other corrections are purely editorial.