

## **Progress report from the Electrical Vehicle Safety Global Technical Regulation (EVS-GTR) Informal working Group.**

### **I. Introduction**

1. The intention of this document is to provide a progress report to the Executive Committee of the 1998 Agreement (AC.3) on the development of the draft GTR for electric vehicles, recommended by GRSP at its May 2014 session and request for an extension of the mandate for the informal working group.

### **II. Background**

2. The executive committee of the 1998 Agreement (AC.3) gave in November 2011 a general support to a joint proposal by the United States, Japan and the European Union to establish 2 working groups to address the safety and environmental issues associated with electric vehicles (EVs). This proposal (ECE/Trans/WP.29/2012/36. and its Corr1) has been submitted to the World Forum for Harmonization of Vehicle Regulations (WP 29) at its March 2012 session for further consideration and formal adoption. The WP29 Committee has adopted this proposal with China as one of the co-sponsors together with the United States, Japan, and European Union, and recorded in the reports. The objective of the 2 working groups is to seek regulatory convergence on the global scale via the work in the framework of the 1998 Agreement.

3. The GTR will address the unique safety risks posed by EVs and their components. It will be performance-based to the extent possible so as not to restrict future technologies. It will be preceded by an exchange of information on current and future planned domestic regulatory safety requirements for electric vehicles based on section C of the formal proposal, (ECE/TRANS/WP.29/2012/36 and its Corr1) including the underlying scientific and technical basis and research.

4. Given that electric vehicle technology is advancing and vehicle manufacturers are planning to produce EVs at higher production volumes in the near future, it is necessary to limit the safety risks of EVs while in use and after a crash event, from electrical shocks associated with the high voltage circuits of EVs and from potential hazards associated with lithium-ion batteries and/or other rechargeable energy storage systems (REESS) (in particular, containing flammable electrolyte).

5. The GTR will also set provisions and test protocols to ensure the vehicle system and/or electrical components perform safely, that are appropriately protected, and electrically managed while recharging from external electricity sources, whether at a residence or other charging location.

6. The GTR will cover high voltage electrical safety, electrical components such as electric connectors and inlet, and REESS in particular, containing flammable electrolyte. The provisions will address the safety of electric vehicles, both in-use and post-crash. The key items would be as follows:

- a. **In-use:** normal operation of the vehicle excluding maintenance and repair
  - a) protection against electrical shock
  - b) Safety requirements for conductive and inductive charging including connectivity
  - c) Safety requirements for REESS risks, including thermal shock, thermal cycling, mechanical shock, over-discharge, isolation resistance, over-charge, vibration, fire resistance and short circuit, etc.
- b. **During and post-crash:**
  - a) protection against electrical shock
  - b) REESS crashworthiness including the limitation of electrolyte leakage, physical battery retention, and the maintenance of essential safety performance.
  - c) REESS safety assessment and stabilization procedure.

Noise issue and EMC will not be addressed by EVS GTR working group.

### III. Progress Report of the 5<sup>th</sup> Meeting and Issues

5. At the June 2014 session of GRSP, the expert from the United States of America, on behalf of the co-sponsors and Chair of the IWG, provided an update of the IWG activity, specifically, the latest 5<sup>th</sup> IWG meeting which took place in Washington DC on May 13-15, 2014. He explained that the IWG has been making good progress in spite of complex and wide range of technical and timing issues.

6. **5<sup>th</sup> EVS-GTR meeting report:**
- a. The IWG continued to exchange information on research and rulemaking activities. Korea provided an update on their adoption of the electric safety portion of the HFCV GTR-13. The US and Canada provided detailed presentations on their Li-ion battery research and investigations on field events, and NCAP test program on EVs.
  - b. These research activities are on electric vehicles and Li-Ion based batteries with a focus at the vehicle and system levels. It's expected that the research will provide science-based regulatory recommendations for the GTR, detailed test procedures as well as supporting technical data.
  - c. The outline of the GTR, which contains the complete list of all technical issues that IWG will address and consider for inclusion in the draft GTR, was updated with new information and estimated completion dates.
  - d. A number of specific provisions of the draft GTR and technical issues were discussed. Some issues were resolved and updated. The remaining issues were tabled for further investigations and discussions.
  - e. The leaders of 7 Taskforce groups provided progress report of their activities. These TF groups were established during the 4<sup>th</sup> EVS IWG meeting in October 2013 to work on specific technical issues. At the 5<sup>th</sup> meeting, the IWG establish a new TF group (No. 8) to study the possibility of expanding the GTR scope to include buses and heavy commercial vehicles. The topics for the TF groups and leaderships are listed as follows:
    - 1) TF-1 – Water immersion and isolation resistance (China)
    - 2) TF-2 – Low electric energy option (US Alliance)

- 3) TF-3 – Electrolyte leakage (OICA, Renault)
- 4) TF-4 – REESS in-use testing (OICA, Daimler)
- 5) TF-5 – Cell/Module/System test (China)
- 6) TF-6 – SOC (Japan)
- 7) TF-7 – Fire Test procedure ( Korea)
- 8) TF-8 – Scope study (China)

7. The IWG also discussed the road map and timeline of the development of the draft GTR. IWG considered the need of developing a complete and comprehensive GTR and taking into consideration the completion of the on-going research as well as planned testing. Since some of the research tasks and testing will not be completed until sometime in 2015, IWG recommended to seek endorsement of AC.3 to extend the mandate of IWG until December of 2015 to submit a draft GTR to GRSP.

8. The IWG request for extension of its mandate is based on the following estimated timeline and milestones:

- 1) December 2015: Submit draft GTR as informal document to GRSP
- 2) May 2016: Submit draft GTR as formal document to GRSP
- 3) June 2016: Submit draft GTR as informal document to WP.29
- 4) November 2016: Submit draft GTR as formal document for a vote at WP.29

9. The 6<sup>th</sup> IWG meeting is scheduled for the week of November 17th, 2014 in Korea.

## **IV. Conclusions**

10. The co-sponsors of the EVS-GTR IWG are requesting for AC.3 endorsement to extend the mandate of the IWG until December of 2015 to submit a draft GTR to GRSP. It's important to allow more time to complete the research, testing and studies that provide the technical support for the provisions in the draft GTR.

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