Minutes

Meeting of the Real Driving Emissions (RDE-IWG) – Informal Working Group

27-28th November 2018 – Brussels, Belgium.

1. **Approval of the agenda and of the minutes of previous meeting**
2. **Nature of the meeting:**

This was the second meeting of the RDE-IWG where the discussion was centred on the revision of a draft text provided by the European Commission, which is been analysed point-by-point by a group of stakeholders representing the Contracting Parties (CPs) to both the 58 & 98 agreements, as well as the Industry (OICA) and other interested parties (i.e. NGOs). The intention is to create a Global Technical Regulation (GTR) which could harmonize some elements of the RDE procedure.

1. **Announcements:**

Korea will join in the next RDE-IWG to be held in Geneva and intends to host the fifth RDE-IWG to be held in the second part of 2019. Japan presented a proposal on dates for the fourth meeting to be held in Japan (Tokyo) 3-4 April 2019 (later changed to 1-2 April 2019). The group is requested to confirm as soon as possible participation in Japan for logistic requirements.

1. **List of points discussed and summary of main discussions**

**DAY 1**

India representatives presented Indian RDE approach: In September 2016, Indian Government announced introduction timing of BS VI including RDE.

Monitoring Tests for RDE will start along with BSVI implementation from 1st Apr 2020.

Compliance Tests with Conformity Factors (which are to be defined) will be implemented from (1st April 2023).

Accuracy is an issue also considering 1 and 2 cyl engines. Effect of High Temperature and Low Flow Conditions also need to be assessed. In Q3 2019 they will complete testing work on this as they will require specific adaptations for their unique conditions.

For COP (Conformity of Production) they do have an option of mileage approach as per COP provisions and is left as a choice for the manufacturer. The Indian RDE is based on EU RDE 3rd package, and the test cycle is based on BSVI Type Approval Test Cycle (MIDC – Modified Indian Driving Cycle- which is primarily the EU NEDC limited to 90km/h). Future work may be considered to analyse also RDE package 4.

OICA presentation:

OICA presented key principles that industry would like to suggest for the continuous work and especially on the technical points to be discussed.

EU COM raised some points of concern, in particular: in EU COM’s view, the CF needs to be 1+uncertainty of measurement. Any allowances for other factors will need to be accounted for in regional regulations at the option of the contracting parties. The Commission also agreed on the importance of robust analysis, to be able to have a sound methodology, and the key question of how to deal with different cycles.

USA presentation:

USA gave a brief presentation with some significant content identifying key work streams required for them to analyse how RDE could be helpful to their region. Their main concerns are: i) Could EU RDE capture some of the issues that the US EPA engineers have discovered by their PEMS analysis?, ii) how to analyse the vehicle behaviour with the RDE procedure? iii) determine if the PEMS measurement uncertainties are appropriate for US standards iv) determine how much of US driving is covered by the current EU RDE procedures.

Discussion on the presentation covered some OICA concerns regarding how USA is intending to proceed to understand all the points above. And how will this be comparable to the analysis carried out already in Europe. EU COM expressed uncertainty about EU RDE catching all what’s required by USA, but acknowledged that a detailed analysis would lead to some significant results. EU COM offered data for USA to extend their analysis.

Review of draft text:

Draft is being discussed and several chapters have raised questions from different CPs, in this session coverage of the test was discussed, and EU COM offered to draft a technical report based on RDE package 4. OICA suggested that the uncertainty should be accounted for during the data processing rather than as part of a CF which is applied to the limits. Focus in Europe for pollutants has been in NOx and Particle Number but further work is required for additional pollutants.

Discussion also covered Software (SW) post-processing tool validation, HORIBA expressed that in the vast majority of cases, the calculation tool has been validated by an authority. However, different interpretations can be made by different authorities. In some cases they had to have 2 versions to fulfil all requirements.

On the boundary conditions, there are several CPs and participants questioning if it is the case to define regional boundary conditions, final GTR could also be left open as to be defined by contracting parties. UK expressed the complexity to leave it open for every region to choose and the struggle with the concept of harmonization.

On trip requirements, some CPs like USA will analyse how they could use such a trip to cover their requirements (it will be part of their analysis), EU-COM acknowledges that the text is general, but is nonetheless important to prevent deliberately non-normal driving with the intention of either passing or failing a test. Several issues must be addressed to cover different CPs (USA, India, etc), for example RDE trip shall cover the range of speeds of the regulatory drive cycles of the contracting parties.

On the Fuel requirement, Japan requested as an option, in the event of a failure, the RDE test may be performed again with reference fuel. EU-COM agreed with Japan’s proposal as an option, but very clear that this option would not be adopted for Europe.

On the annexes, one of the main points was the validation test that for now will remain as optional, regarding the reference to “an applicable test cycle”, permissible tolerances would need to be defined for different cycles. Some CPs like India expressed that different cycles will require different tolerances (e.g. different cycles have different amounts of idle). They also suggested that the PEMS equipment manufacturers can support this work.

On trip validation, JRC work is comprehensive on this point and they will be showing some examples on how it is done in Europe. On MAW, some CPS like India are still considering the appropriate definition for averaging window. Assessing different definitions based upon MIDC (70% - 100% of CO2). So far, looks like 100% (or close to 100%) is most appropriate.

Presentation on PEMS measurement uncertainty 2017 assessment – JRC:

JRC presented how to calculate the margin on the PEMS instrumentation which led to the modification of the NOx margin for RDE4 to 0.43. USA requested the excel sheet used in the presentation to be able to understand better the procedure. EU COM advised on the work being carried by CEN and the investigation on different operative boundaries being carried out during this period. JRC also suggested the Margin of uncertainty needed to be better defined. It also needs to be expressed in general manner to be able to accommodate uncertainty at various emission levels. The influence of zero drift will also need to be reviewed since the initial analysis was inconclusive.

**DAY 2**

Presentation on analysis methodologies by JRC

JRC presented how MAW works and methodology followed in Europe for RDE, JRC also suggested that independent reviews, like the one performed by TNO have shown high variability as a result of using MAW and PB methods to calculate final emissions, therefore the decision in RDE 4 to use the MAW only to validate the trip and no more to calculate final emissions. MAW is kept as a check for the trip severity. USA requested clarifications on how improvements to validity check were made? JRC explained two separate processes, find how to exclude trip that are abnormal, this was possible with analysis that showed biased driving. JRC also clarified that European Commission needs to avoid biased RDE testing by third parties (which can test vehicles according to EU legislation from 2019). Final emissions are now de-coupled from MAW assessment.

All the CPs were aligned on the intention to carry some test and analysis work which would include WLTP and data analysis both as it is done in Europe and also using their respective cycles to validate the accuracy of such methodology using different cycles.

Further draft discussion:

On Appendix 6, EU COM reiterated the request for contracting parties to assess the trip validity and emissions analysis method with data collected from vehicles in their own territories. Discussing cycles, EU COM asked JAPAN if is there a need for separating the 3-phase vs 4-phase for the analysis methods. JAPAN added the separate text as a place-holder to be updated once they have determined appropriate RF values. Japan are currently analysing data sets to see whether there is any technical justification for deviation in RF values used for EU-RDE.

On Appendix 7, EU-COM request to other contracting parties to review the PEMS family definition. US commented that they will review the family definition in light of their own grouping definitions. EU COM also requested clarification to the industry about the for positive altitude gain provisions in appendix 7b.

1. **Conclusions/recommendations/opinions**
* Discussions will continue in 2019; the initial time schedule is still considered to be ambitious
* EU COM offer data used in previous studies to CPs to analyse their different approaches.

E U will also provide cleaner version for review prior to January session.

* Technical annexes: the participants were requested to send information and comments on the technical annexes.
* Please also send comments on your position about: Can PEMS standard be raised to ISO level?
* The secretariat will share again report on TNO. And possibly ACEA presentation on the reflection of the TNO analysis.
* All CPs are encouraged to assess the emissions analysis method, particularly looking at the behaviour of emissions under more aggressive driving. CPs will also need to consider how to adapt the analysis method for their own drive-cycles.
* If other CPs plan to perform testing programs it would be good to explain what you should be looking at and work on a common program for the different CPs
* Chair and co-chair will contact China again to get them engaged on this discussion.
1. **Next meeting:**

January 9th 2019, Geneva.

1. **List of participants:**

M. Braisher (OICA), M. Bratfisch (OICA), W. Coleman (OICA), R. Cuelenaere (NL-TNO), A. Dijkhuizen (NL), C. Favre (AECC), A. Feucht (BMW), D. Hannah (UK), N. Ichikawa (Japan), N. Kenzo (OICA), Y. Kono (MLIT Japan), P. Mendoza Villafuerte (OICA), S. Morita (JASIC Japan), P. Ohlund (Sweden), D. Robarft (CLEPA), M. Sakai (OICA), Z. Kregar (EU COM), P. Bonnel (EU COM), A. Zardini (EU COM), R. Suarez Bertoa (EU COM), G. Lombardo (OICA), T. Meisner (OICA), T. Niikuni (NTSEL Japan), M. Rauch (CLEPA),D. Robart (phone), M. Lakstigala (CLEPA), A. Koyanagi (OICA), D. Vipin (SIAM), J. Goodman (Canada), S. Morimoto (OICA), Y. Khellaf (OICA), L. Hill (Horiba), V. Sadan (India), X. Leng (OICA), W. Tober (Austria), J. Sanchez (USA - phone), A. Fernandez (phone), A. Forcetto (Brazil - phone), M. Lange (UBA - phone), apologies from Korea.