WLTP Sub Group EV meeting	
Date	22-23th of June 2015
Time	June 22 > 10:00 to 18:00 CET June 23 > 9:00 to 18:00 CET (June 24 > 9:00 to 13:00 CET for extra EV drafting)
Location	JAMA Europe (Brussels)
Title	WLTP Sub Group EV Meeting minutes
Working Paper Number	WLTP-SG-EV-09-15 Meeting minutes

Agenda

Open issues			
1		Welcome and adaption of agenda	WLTP-SG-EV-09-01
2	#02, #56, #55	Interpolation(CO2) family except for Rcda Interpolation(Combined) approach except for Rcda Phase specific calculation except for Rcda	WLTP-SG-EV-09-02-rev1 WLTP-SG-EV-09-03 (WLTP-SG-EV-08-03) WLTP-SG-EV-09-12 WLTP-SG-EV-09-13 WLTP-SG-EV-08-05-rev1

Conclusion

- Agree to use confirmation cycle to calculate vehicle H parameters in case Rcdc of vehicle H is different from that of vehicle L. Rcdc difference shall be up to one.
- Include transition cycle in case of above in phase calculation since Rcda is not needed as parameter for individual vehicle.

  Rcda (whole cycle) for calculation of vehicle H and vehicle L as it is.
- For interpolation CO2 range in CS regarding use of vehicle_M in addition to vehicle L and vehicle H, additional 10g/km(CO2 in CS) is allowed, with the maximum range of 30g/km.
- Agree that the criteria for linearity check should be 3 percent or 3 g/km whichever is smaller with allowed minimum tolerance for the linearity of 1 g/km.
- Family definition regarding CVT transmission is developed and agreed on.

  Reference to document WLTP-SG-EV-09-02-rev1.
- Family definition regarding planetary gear shall be confirmed by JAMA.(until 10th July)
- ACEA will provide AERcity calculation formula for OVC-HEV in CD by using whole cycle test results.
- Agreed on PEV family criteria.

Discussions

Presentation of WLTP-09-12. Possible to calculate City cycle. Different UBE for whole cycle compared to only city cycle.

The results are probably accurate enough. Needs to discuss in JP no position yet. Propose to develop GTR test to help for a fast adoption.

Also needs to decide if the method should be an option or mandatory.

PSV for OVC-HEV. Simulation of four cases. Shows good linearity. Outlier because of not weighted value, other values are. Jama concern regarding not include transition cycle for PSV but not for whole cycle. Same method should be used for PSV and whole cycle despite the fact that it includes some error. T&E of the opinion that it is wrong to include transition cycle for calculation of CD condition since also include CS condition.

JP will not require Rcda for PSV. And if Rcda is not required the inclusion or not of the transition cycle do not have an impact. Therefore propose to include based on request from JP.

EU position regarding Rcda, the calculation should stay in the GTR but will not use for individual vehicle, customer information.

Different Rcdc for vehicle L and vehicle H, ACEA propose to include a confirmation cycle to give better linearity. JP accepts this approach.

The CO2 requirement for CS condition limits that not possible with more than one cycle difference between vehicle L and vehicle H in one family.

Proposal from ACEA regarding family definition regarding CVT transmission. The expression “to be checked” is not appropriate for regulatory text. Another proposal from JP presented on earlier meeting. T&E of opinion that JP proposal implies that the manufacturer can with software modify conditions between type approval and real vehicles. ACEA proposal with minimum and maximum ratio is more appropriate.

According to JP planetary gear can be different. Proposal to keep d) as it is and put a new point for CVT and planetary gear, minimum and maximum ratio shall be identical within the family.

Concern regarding CO2 family limit requirement in CS condition. Why not a percentage limit also for the case with mid vehicle. JP will consider an appropriate value.

Regarding point c) in the family definition a check with GTR for conventional vehicles gives that there is also a requirement for transmission model which could include transmission ratio and agrees to delete point e). same change also for PEV.

Maybe also need to discuss the linearity when testing three vehicles. There is already a criteria for the linearity of the mid vehicle, 3 g/km. should be a ratio also for consistency. The criteria for linearity check could be 3 percent or 3 g/km whichever is smaller but allowed tolerance for the linearity is 1 g/km. Then it is reasonable to use the option with 10 g/km additional bonus to the criteria.

New proposal from ACEA regarding calculation of AERcity, depending on estimated UBE at engine start in complete cycle. Should be an option to the manufacturer to use this approach. ACEA will develop GTR text to reflect the proposal. EC questions if also needs to measure voltage instead of using nominal voltage for the calculation. For next meeting need GTR draft text and data to be able to evaluate the accuracy of the proposal. T&E propose an option to introduce default values to be able to simulate the voltage. ACEA will work on the proposal including the possibility to measure or simulate the voltage. Alternatively to use onboard data for voltage, confirm accuracy of this signal. The procedure can be finalized with the only open question what value for voltage that should be used. For the next meeting should also prepare data to be able to analyze the accuracy for different values for voltage.

3	#51	Mode selectable switch	WLTP-SG-EV-09-04 WLTP-SG-EV-09-05 WLTP-SG-EV-09-16

Conclusion

- Agree to the flow chart for OVC-HEV in CD test regarding “no mode” branch with the addition to run city cycle with the mode with highest energy consumption. Can be regional option which part of the procedure to use, applicable test cycle with

highest energy demand or city cycle.

- For CS test when there are several modes that can follow the cycle, agree to use average of best and worst case mode with additional option to run only worst case mode.
- Developed proposal from ACEA regarding mode for PEV and capped speed. Can handle several speed caps. Applicable test cycle with capped speed should be base for end of test criterion. The principal is agreed on after online modification of the flow chart.

  Reference to document WLTP-SG-EV-09-16.

Discussions

Presentation of WLTP-SG-EV-09-04. Developed proposal, two steps where first to make sure there is an applicable test cycle.

WLTP-SG-EV-09-06 regarding capped speed for PEV is presented. Incomplete phases are not used in calculations. To continue the test is only to generate database to improve calculation of complete phases. JP can accept approach 1 of the proposal. In principle also from EU.

Approach 1 also works with the current proposal for mode selectable switch. T&E of the opinion that capped speed should be part of determination of applicable cycle in the mode selectable switch flowchart. Also there should be a section regarding capped speed in the GTR. For example what values that can be calculated.

If there is a mode with no capped speed this mode should be used for testing.

ACEA will provide an updated flowchart for mode selectable switch including capped speed.

Mode selectable switch for OVC-HEV in CD mode. OI is when there is no mode that can follow the drive cycle, for CD and CS condition. Different position in JP and ACEA. JP proposal to use city cycle and ACEA to use best effort to follow the cycle. For CS condition should follow the same procedure as for ICE.

Not accepted by EC, much weaker than cycle classification for ICE. Prefer ACEA proposal although not perfect. Or same procedure as for PEV, with full throttle operation. As a compromise could be dependent on the maximum speed of the vehicle, if cannot drive faster than M phase could test in city cycle.

JP will discuss internally and return with proposal later (tomorrow).

Regarding OVC-HEV in CS mode. Also different position between JP and ACEA. Could be an option where ACEA proposal first option with average between best and worst mode and second option test with most fuel consuming mode, JP proposal. ACEA proposal is copy from ICE.

Agree on this approach.

Report of home work from yesterday. JP position for CD test run city cycle and actual speed cycle (best effort). Measure all parameters during city cycle. To sets of contradicting values will be the result. Regional option on how to use them or if only use values from one test. The GTR will provide two procedures. But which mode to use for the city cycle. According to JP the mode with highest cycle energy demand, the same mode as for the best effort cycle. ACEA of the opinion that if several modes can follow the city cycle, should use the mode with highest energy consumption.

4	#52	End of range criteria for PEV	WLTP-SG-EV-09-06 WLTP-SG-EV-09-03

Conclusion

Apply downscale and capped speed. Regions have option to provide the parameter of

capped phase(s) and whole cycle or not.

Discussions

EC comes back to the question of capped speed. Of the opinion that values still should be calculated for the capped phases and whole cycle. JAMA can support this approach as long as vehicles are threatened fairly. Agrees on approach 2 to extend the capped phase to get equivalent cycle distance. Next step to develop text for the GTR on how to generate the capped speed cycle (until 10th July). The capped speed cannot be lower than the speed for constant speed phase if the shortened test procedure is used. Since STP is mandatory need to handle this issue in the GTR.

5	# 58	PEV shorten test procedure	WLTP-SG-EV-08-03 WLTP-SG-EV-09-14

Conclusion

Agrees on the following points:

- Minimum speed for constant speed phase 100 km/h for complete WLTC and 80 km/h for WLTC without ExH phase.

  If the capped speed is lower than the minimum speed for constant speed phase, the constant speed is same as the capped speed.

- Length of last constant speed phase based on less than 10 percent of UBE, to be evaluated after the test.

- Criteria for application of shorten test procedure shall be more than three cycles for four phase cycle and four cycles for three phase cycle. In GTR should be expressed as number of consecutive cycles that should be determined from vehicle H and used for the family

Discussions

Presentation of WLTP-SG-EV-09-14. Accepts that STP should be mandatory with criteria according to previously presented proposal. Constant speed should be a minimum requirement and allow manufacturer to increase the constant speed to reduce test burden further.

The length of the last constant speed phase should be determined using procedure based on SAE J1634. This allows that the same SOC is obtained regardless of the size of the battery.

There are different position in proposal from ACEA and JP regarding criteria for application and constant speed phase. ACEA proposes a minimum speed for the constant speed phase, and the manufacturer can extend the speed of the constant speed phase in order to reduce test burden. EC supports the approach. JP supports the approach but is of the opinion that also needs a maximum speed because road load is not available for higher speeds. Since only interested in SOC rod load is not that important. T&E also supports the approach.

Duration for constant speed phase. ACEA proposes to use the SAE method to determine the length of the end constant speed phase. Agree to use less than 10 percent of UBE.

6		Rcda (cycle & phase)	WLTP-SG-EV-08-07 WLTP-SG-EV-08-08
Refer to the part of interpolation approach			
7		Descriptions how to measure voltage and current	
Will be discussed on web conference in advance of next meeting in Tokyo.			
8		AOB Collaboration with EVE	

SG EV discussed how to collaborate with EVE IWG in phase 2.

EC pointed that real world situations should be reflected on GTR. Thus, WLTP IWG should proceed the development of GTR considering the cycle and environment which vehicles are used in.

Focusing on EV, more technical investigations will be necessary to develop test method especially for battery durability and low ambient temperature maybe not as low as -7 degrees, more in the order of 0 to 10 degrees. EC proposed that SG EV should continue its work during phase 2. The SG EV agreed on the proposal from EC. WLTP SG EV could be a channel to collaborate with EVE during WLTP phase 2.

9		EV Drafting (annex 8)	

Drafting according to agreement on SG EV meeting 07 will be finalized and distributed in SG EV 24th of July. Distributed to SG drafting 7th of August.

JP responsible for STP, and FCV.
ACEA responsible for mode selectable switch.
ACEA responsible for combined approach.
ACEA responsible for downscale method for PEV.
ACEA responsible for RCB correction
JP responsible for phase specific calculation.
Heinz Steven responsible for extended cycle for capped speed

Face to face meeting within EU 11th and 12th of August in Brussels.

Web/audio with JP 20th of August 08:00 to 13:00 CET. VW will provide conference system.