

RDE GTR Structure

1. GENERAL REQUIREMENTS

- Anything not falling under the following sections

2. VEHICLE CONDITION AND PREPARATION

- Vehicle requirements prior to PEMS testing

3. TRIP REQUIREMENTS

- Definition of the trip to test the vehicle
- Coverage requirements for the low, medium and high speed driving conditions

4. BOUNDARY CONDITIONS

- **List of operating conditions associated with the regional emissions limits**
- Expressed for ambient temperature, altitude, cumulative altitude, driving dynamics

5. VEHICLE TESTING

- General requirements for vehicle testing
- How to test the vehicle, which instruments to use?

6. VERIFICATION OF TRIP VALIDITY

- Upon test completion, methodologies to verify that the trip fulfils the coverage requirements laid down in point 3 and falls within the boundary conditions defined in point 4.

7. EMISSIONS CALCULATION

- If the test is considered as valid after Point 6, methodology for the emissions calculations

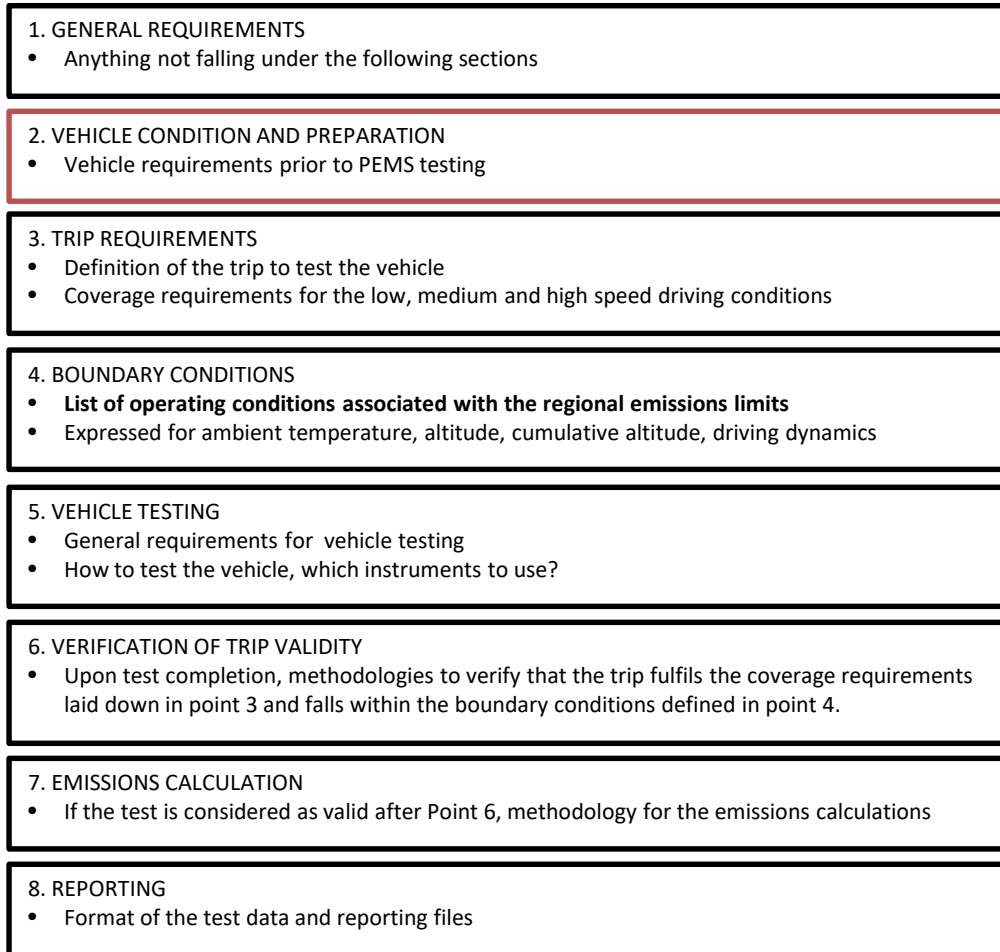
8. REPORTING

- Format of the test data and reporting files

Main Contents:

- Rounding
- General obligations for vehicle manufacturers and contracting parties

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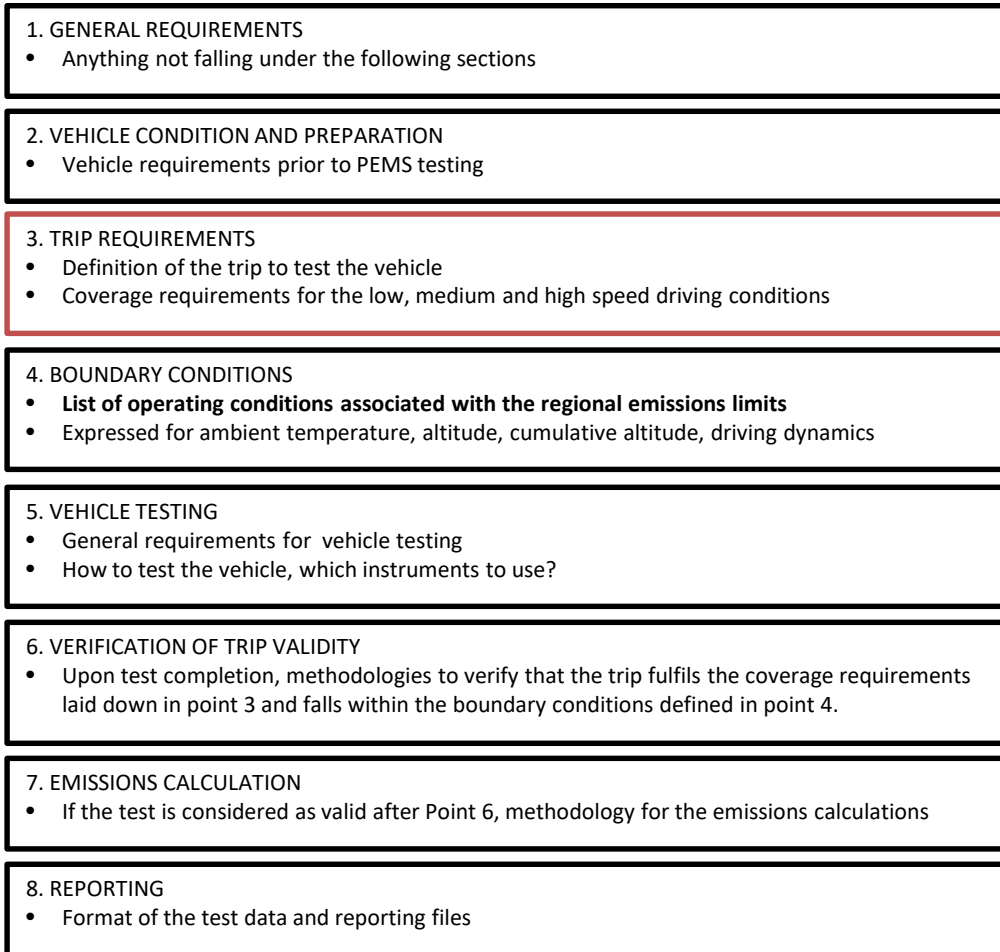
Main Contents:

- Mechanical condition, tires, aerodynamics
- Checklist
- Lubricating Oil, Fuel and Reagent

Remarks:

- The permissible vehicle test mass is part of the boundary conditions (Section 5)*

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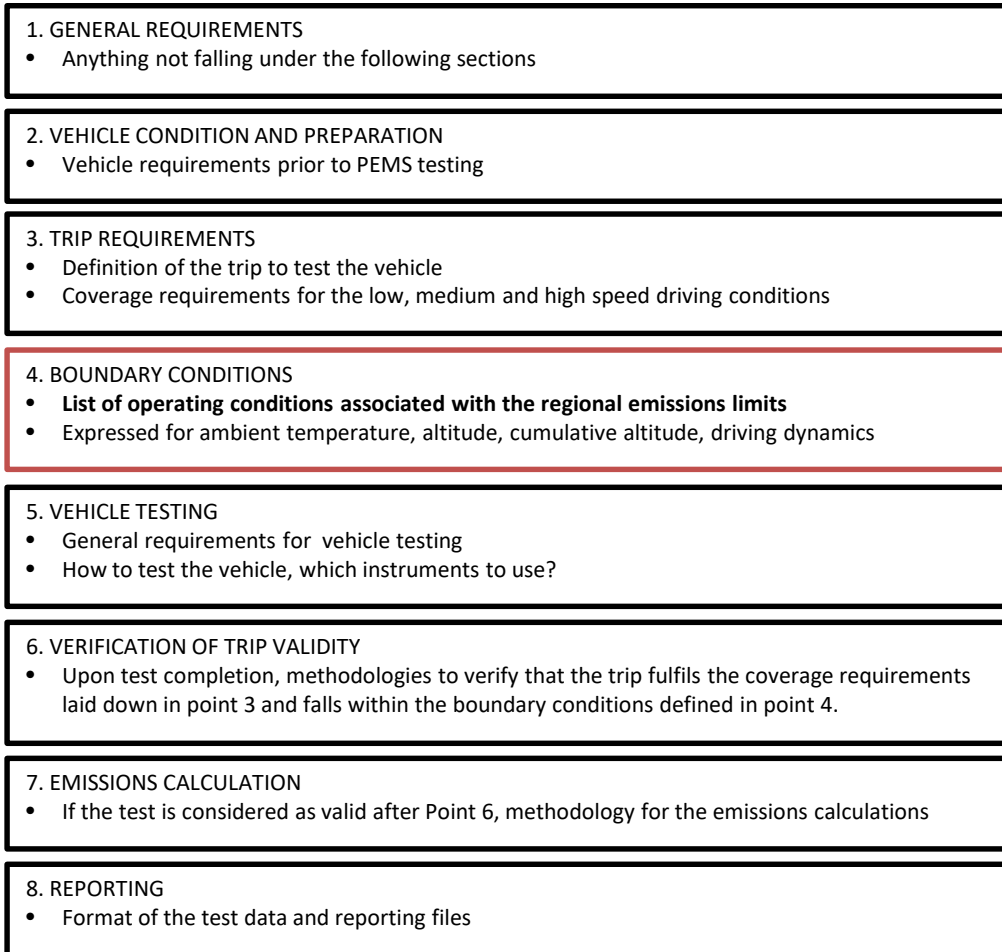
Main Contents:

- General provisions (Who validates the selected trip?)
- General trip requirements (duration, distance...)
- Shares of low/medium/high speed driving
- Specific regional requirements to ensure that the driving during the test reflects the regional driving

Remarks:

- Prescribes the minimum set of conditions to be covered within a single test*
- The maximum duration is introduced to limit the risk of instrumentation drift*

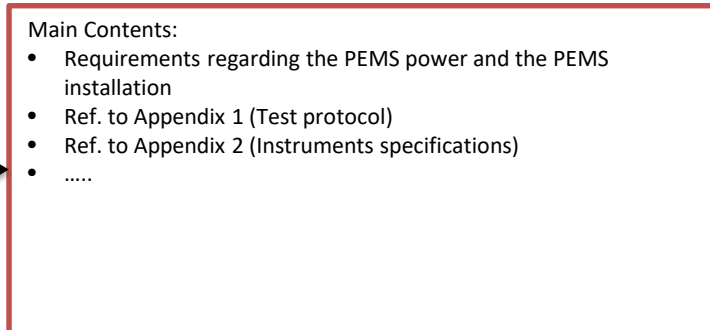
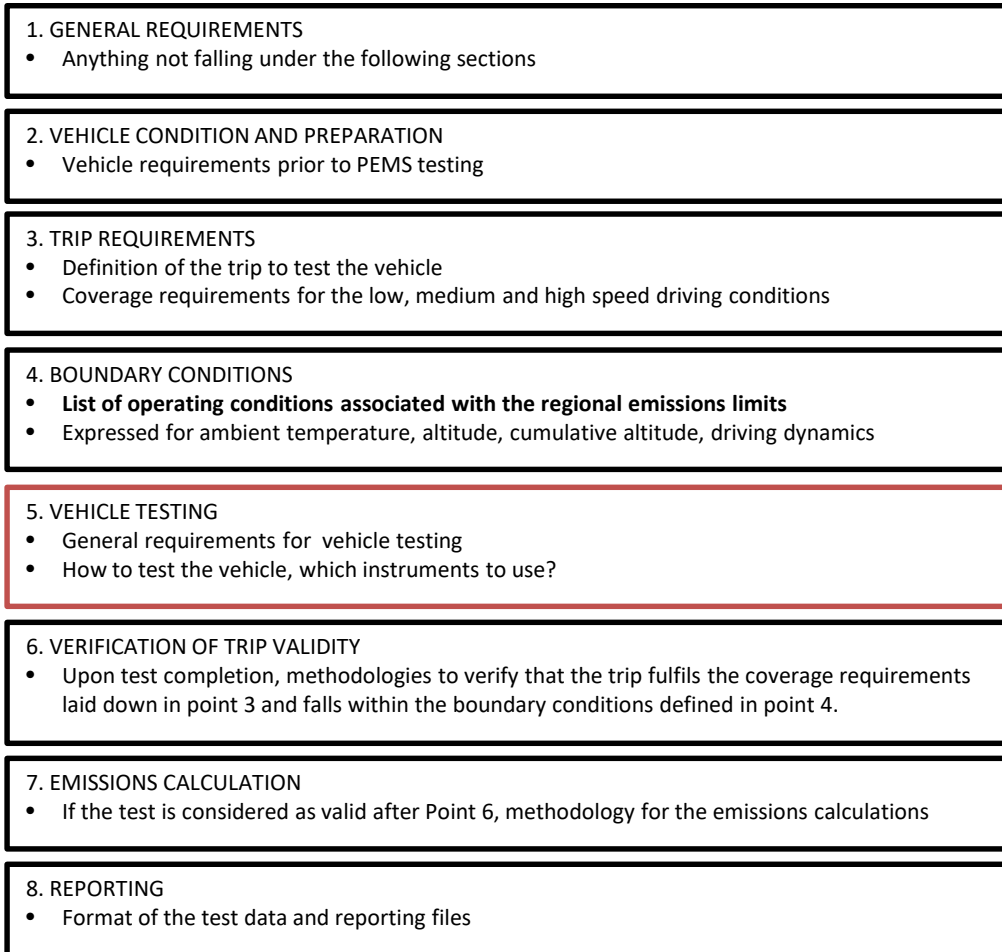
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Main Contents:

- Vehicle payload and test mass
- Ambient conditions
- Vehicle conditioning for cold engine-start testing
- Cumulative altitude gain
- Dynamic conditions
- Vehicle condition and operation (Auxiliary systems, regenerating systems, provisions for vehicle modes including OVC-HEV case)
- General provisions to avoid vehicle misuse
-

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- If the test is considered as valid after Point 6, methodology for the emissions calculations

8. REPORTING

- Format of the test data and reporting files

Main Contents:

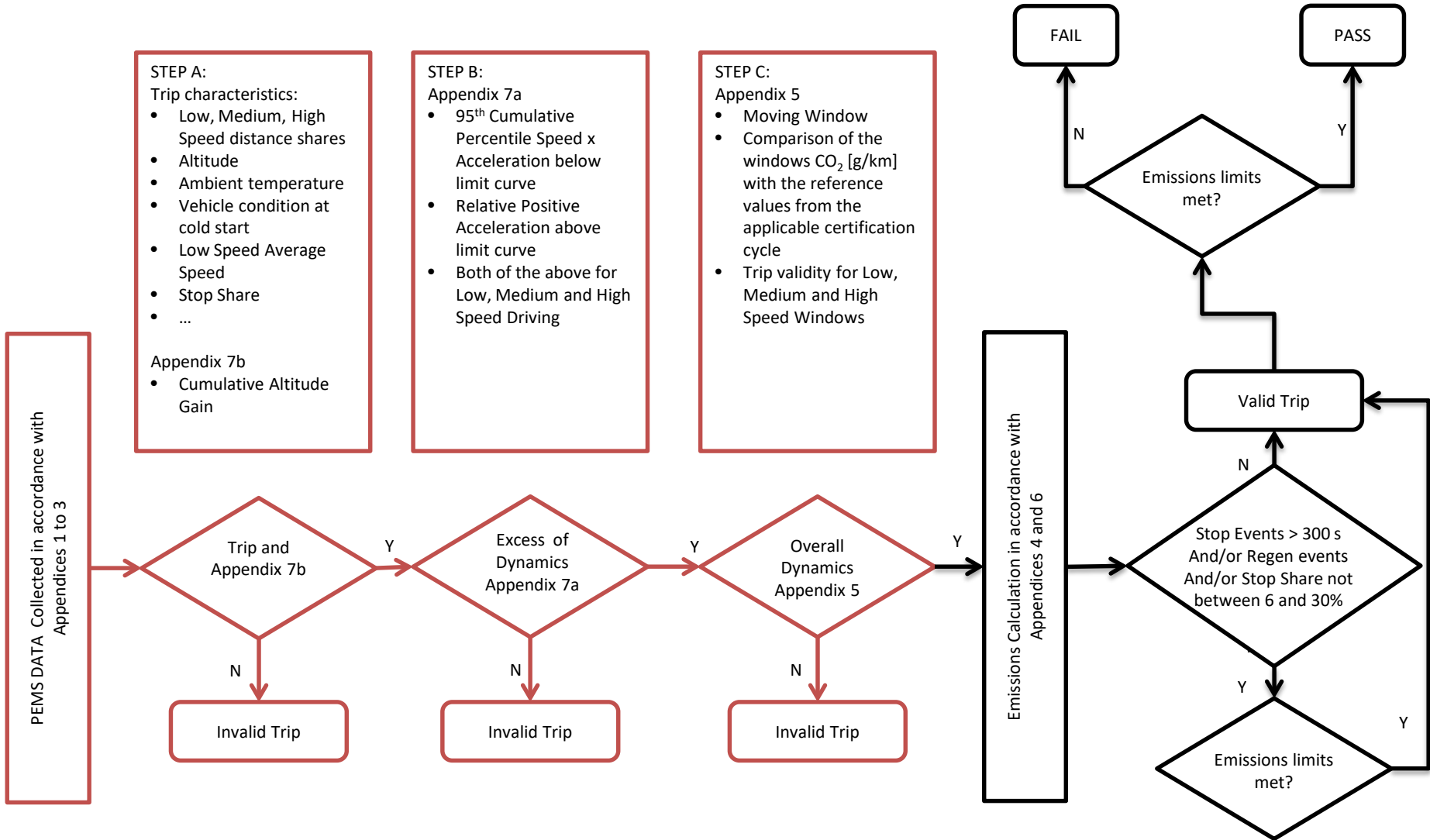
- Prior to the assessment of the trip validity, the consistency of the following ambient temperature, altitude and GPS signals (when applicable) shall be verified
 - The trip validity shall be evaluated for:
 - The coverage requirements (Point 3)
 - Its compliance with respect to the boundary conditions (Point 4)
- in accordance with the general flow chart

Main verifications for the trip validity:

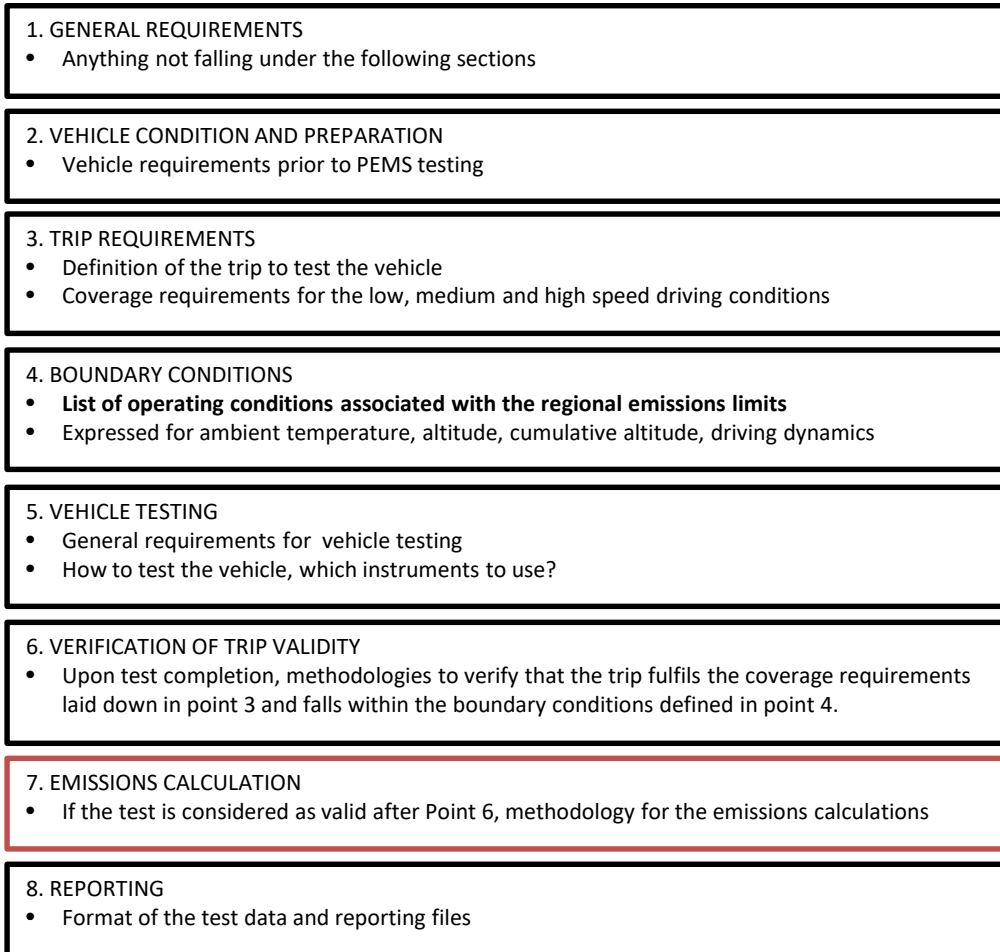
- Trip requirements including distance shares, stop shares,...
- Percentage of data within the altitude and ambient temperature boundary conditions
- Cumulative altitude gain (Ref to Appendix 7b)
- Excess or absence of driving dynamics (Ref to Appendix 7a)
- Overall dynamics (Ref to Appendix 5)

The Valid/Invalid Trip is a result of the above process, unless specified at the next point in presence of regeneration events or long stop events

RDE Data Evaluation steps



RDE GTR Structure

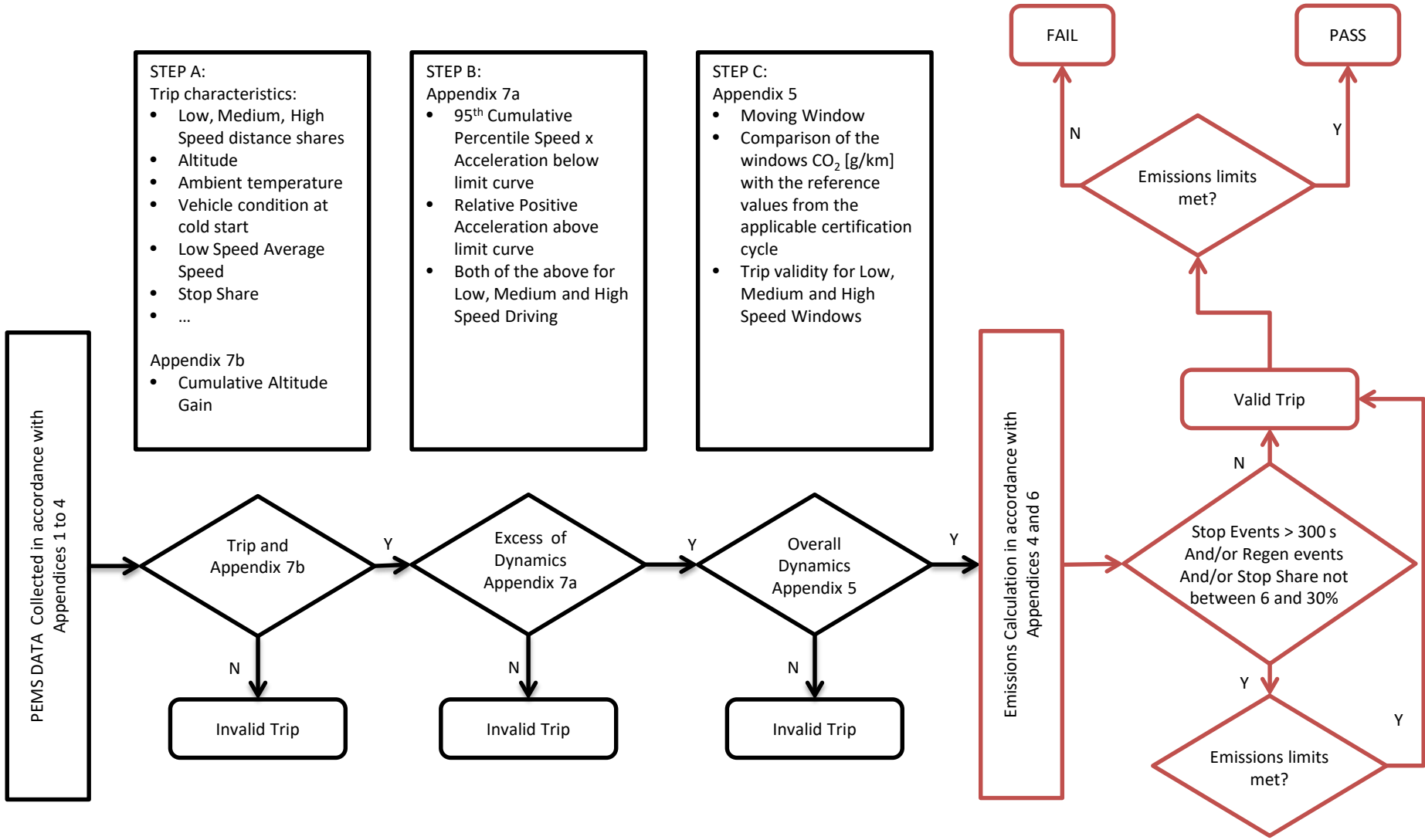


Main Contents:

- Provisions for the application of the factor for the extended conditions
- Calculation of instantaneous emissions (Ref to Appendix 4)
- Calculation of final emissions (Ref to Appendix 6)

For valid trips, a Pass/Fail Test is the result of the comparison of the final RDE emissions with the applicable emissions limits

RDE Data Evaluation steps



STEP A:
 Trip characteristics:

- Low, Medium, High Speed distance shares
- Altitude
- Ambient temperature
- Vehicle condition at cold start
- Low Speed Average Speed
- Stop Share
- ...

Appendix 7b

- Cumulative Altitude Gain

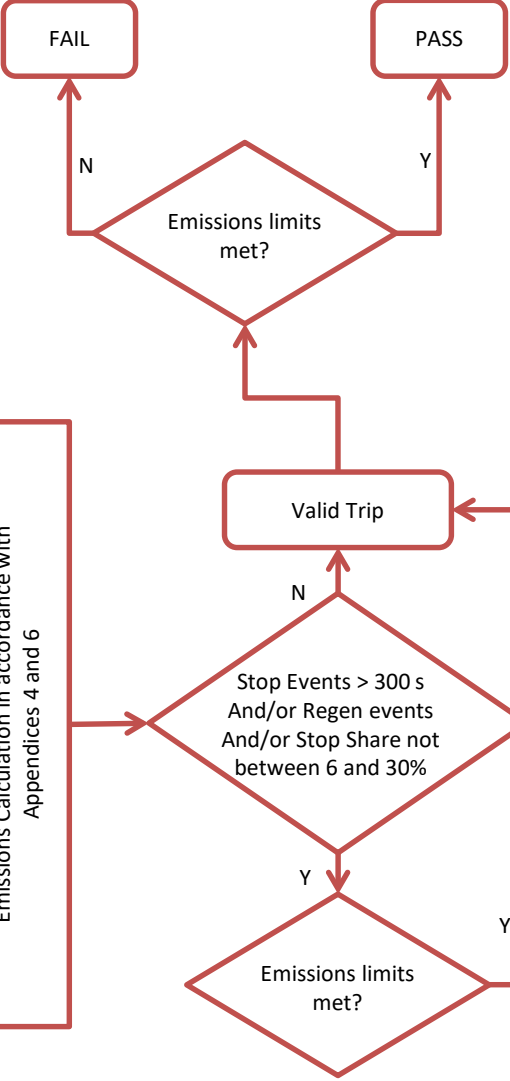
STEP B:
 Appendix 7a

- 95th Cumulative Percentile Speed x Acceleration below limit curve
- Relative Positive Acceleration above limit curve
- Both of the above for Low, Medium and High Speed Driving

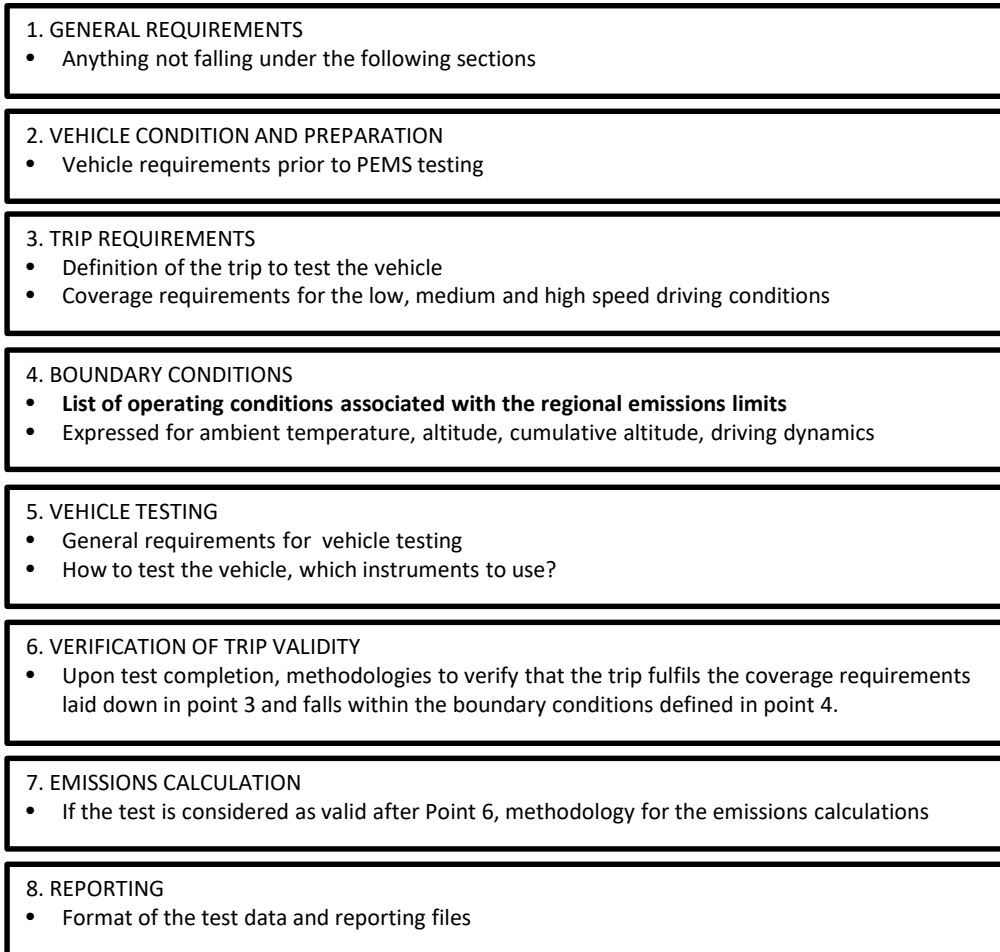
STEP C:
 Appendix 5

- Moving Window
- Comparison of the windows CO₂ [g/km] with the reference values from the applicable certification cycle
- Trip validity for Low, Medium and High Speed Windows

Emissions Calculation in accordance with Appendices 4 and 6



RDE GTR Structure



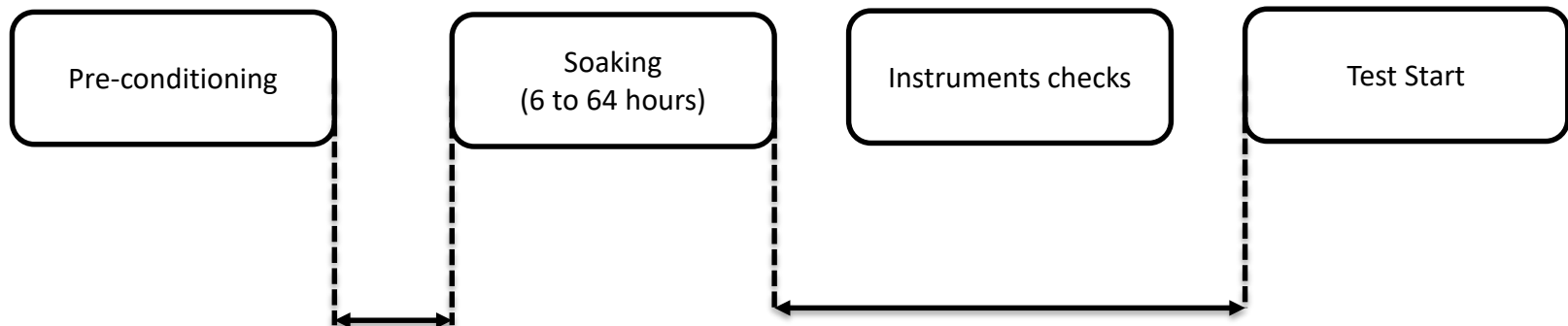
Main Contents:

- General provisions (What needs to be reported and by/to whom)
- CSV File on Wiki

Open Points (JRC)

1. Provisions for time allowed in the sequence: pre-conditioning > start of soaking > test start

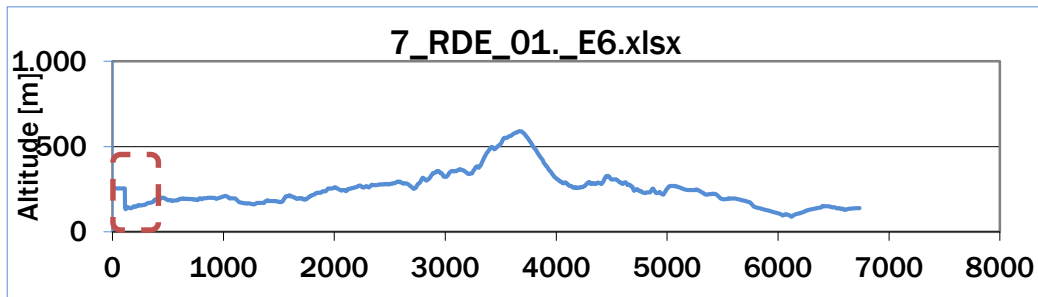
- One pre-conditioning per test or per series of tests?
- No clear definition for the "end of soaking" (presumably the stop of monitoring of soak parameters)
- No provision on the time allowed between the "end of soaking" and "test start"
- Rationale: Problem when PEMS is used for soak monitoring. When PEMS soaking mode is switched off, still 1 hour is needed for PEMS calibration with no possibility of soak monitoring. This time could be in principle extended indefinitely.
- Similar provision is needed for the time allowed between "end of pre-conditioning" and "start of soaking". At present any valid preconditioning test made in the past (1 hour before, 1 month before) can be taken.
- **Proposal: Provisions in Appendix 1**
"The duration between the pre-conditioning and the soaking of the vehicle should not exceed 24 hours"
"The duration between the end of the soaking and the test start should be as should as possible and cannot exceed 1 hour"



Open Points (JRC)

2. Data consistency checks (Altitude and Ambient temperature)

- Altitude signal is smoothed and outliers are eliminated during the calculation of the cumulative altitude gain.
- Problems occur very often at test start, when the GPS is not active.
- As a consequence, the GPS altitude value at test start (see example below) are false and can lead to significant errors in the calculation of the cumulative altitude gain.
- **Proposal 1: Provisions in the text are sufficient for the GPS altitude. Currently, we encounter only limitations in their software implementation.**
- **Proposal 2: It is suggested to add a sentence to remove the outliers for the ambient temperature, as they may lead to the undesired application of the extended factor for some data points.**



- **CONSISTENCY CHECK OF VEHICLE ALTITUDE**
In case well-reasoned doubts exist that a trip has been conducted above of the permissible altitude as specified in point 5.2 of this Annex and in case altitude has only been measured with a GPS, the GPS altitude data shall be checked for consistency and, if necessary, corrected. The consistency of data shall be checked by comparing the latitude, longitude and altitude data obtained from the GPS with the altitude indicated by a digital terrain model or a topographic map of suitable scale. Measurements that deviate by more than 40 m from the altitude depicted in the topographic map shall be manually corrected and marked.