



# Real-driving emissions regulation update

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## Index

- A quick recap of current RDE packages 1 to 3
- RDE package 4: in-service conformity testing
  - *New statistical procedure*
- Next steps for RDE



# A quick history of RDE: packages 1 to 3



## Timeline and legal architecture of RDE

- **RDE1 (2011-2015):** Testing framework and data evaluation methods (how to perform RDE tests and how to calculate results) *Reg. EU 2016/427*
- **RDE2 (2015-2016):** Additional boundary conditions for tests, conformity factors for NO<sub>x</sub> (limits to what kind of driving is included in RDE tests and NO<sub>x</sub> emission limits that apply) *Reg. EU 2016/646*
- **RDE3 (2016-2017):** Evaluation of cold-start emissions, conformity factors for PN, LCVs, regeneration events, hybrid vehicles, transparency provisions. *Reg. EU 1154/2017*
- **RDE4 (2017-2018):** In-service conformity testing, "reviews" and other issues. *Reg. EU XXX/2018*

# RDE4 in a nutshell

## Main topics:

- **In-service conformity testing** (introducing *independent testing by third parties*) – key novelty
- Type-approval issues related to multi-stage LCVs and special-purpose vehicles
- Other open issues (e.g., heavy fuel effects on PN)

## Reviews:

- More representative method for testing hybrid vehicles
- Reviews of
  - *data evaluation methods (choice of single method – raw data is an option)*
  - *uncertainty margin for NO<sub>x</sub> (CF is 1 + margin) – JRC analysis calculated uncertainty 24% to 43% at 80 mg/km*



# **RDE package 4: in-service conformity testing**



## ISC for LDVs in current legislation

In Regulation (EC) 715/2007 (Euro 5 and Euro 6), Article 4.2:

- Manufacturers shall ensure that type approval procedures for verifying conformity of production, durability of pollution control devices and **in-service conformity** are met.
- [...] in-service conformity measures shall be checked for a **period of up to five years or 100,000 km**, whichever is the sooner.
- In-service conformity shall be checked, in particular, for tailpipe emissions as tested against emission limits set out in Annex I. In order to improve control of evaporative emissions and low ambient temperature emissions, **the test procedures shall be reviewed by the Commission.**



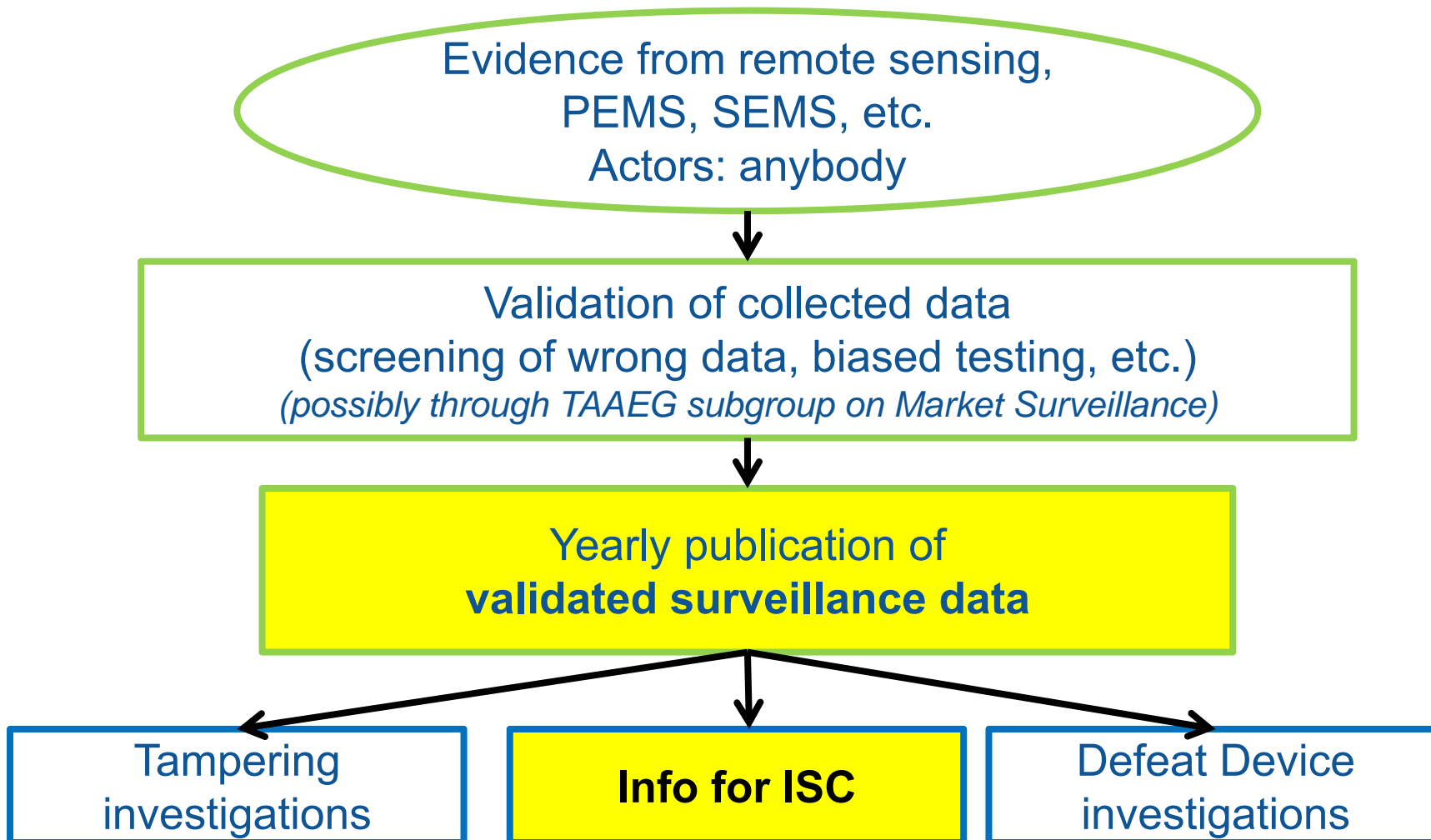
## ISC for LDVs in current legislation

### Key changes to ISC introduced by RDE4:

- **New emission tests:** RDE testing will be part of ISC testing
- **New ways of incorporating real-world emissions data**
- **New actors:** third parties can now participate in ISC testing
- **New procedure:** statistical procedure for reaching a conformity decision is streamlined and strengthened; vehicle sourcing criteria are updated; new data exchange systems



## 'Big picture' of emissions surveillance



# New ISC procedure

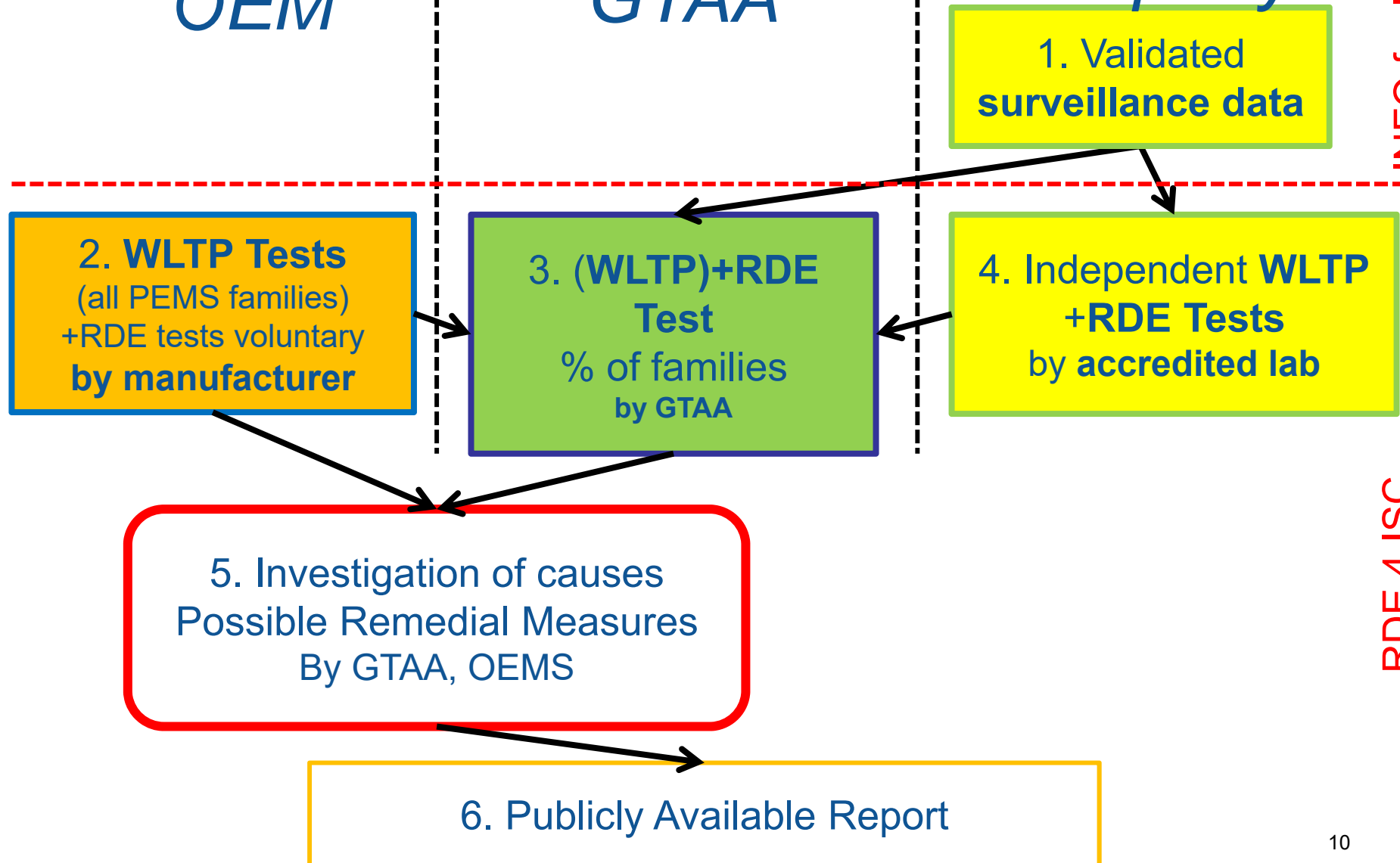


*OEM*

*GTAA*

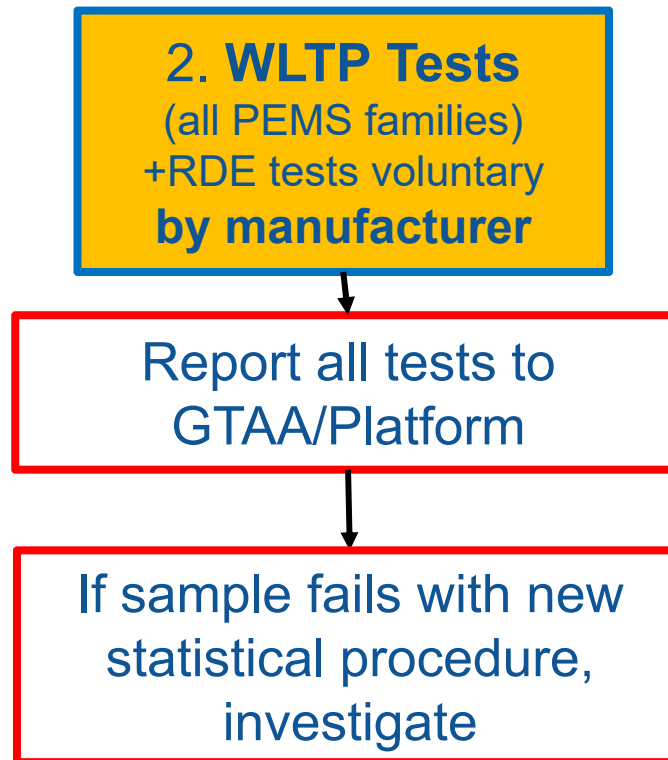
*3rd party*

INFO for ISC

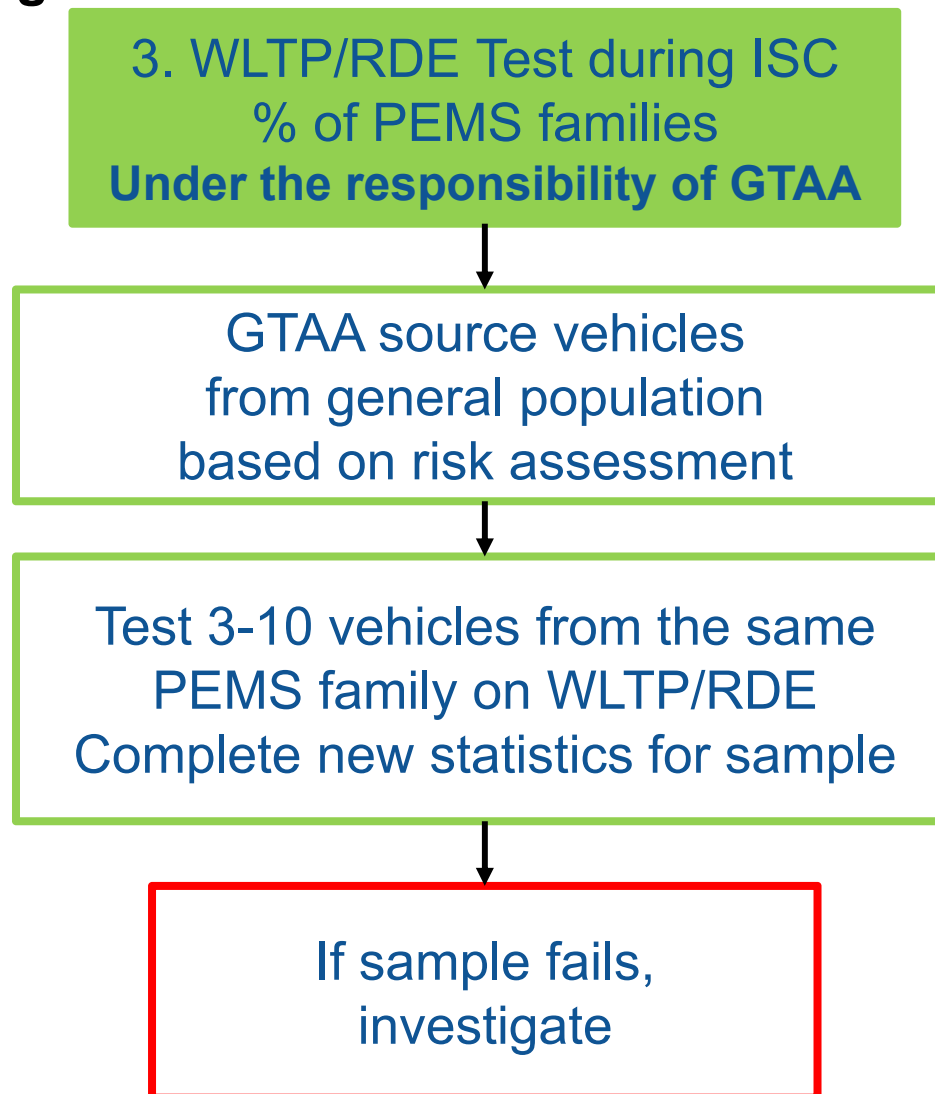


## 2. ISC with WLTP by vehicle manufacturers

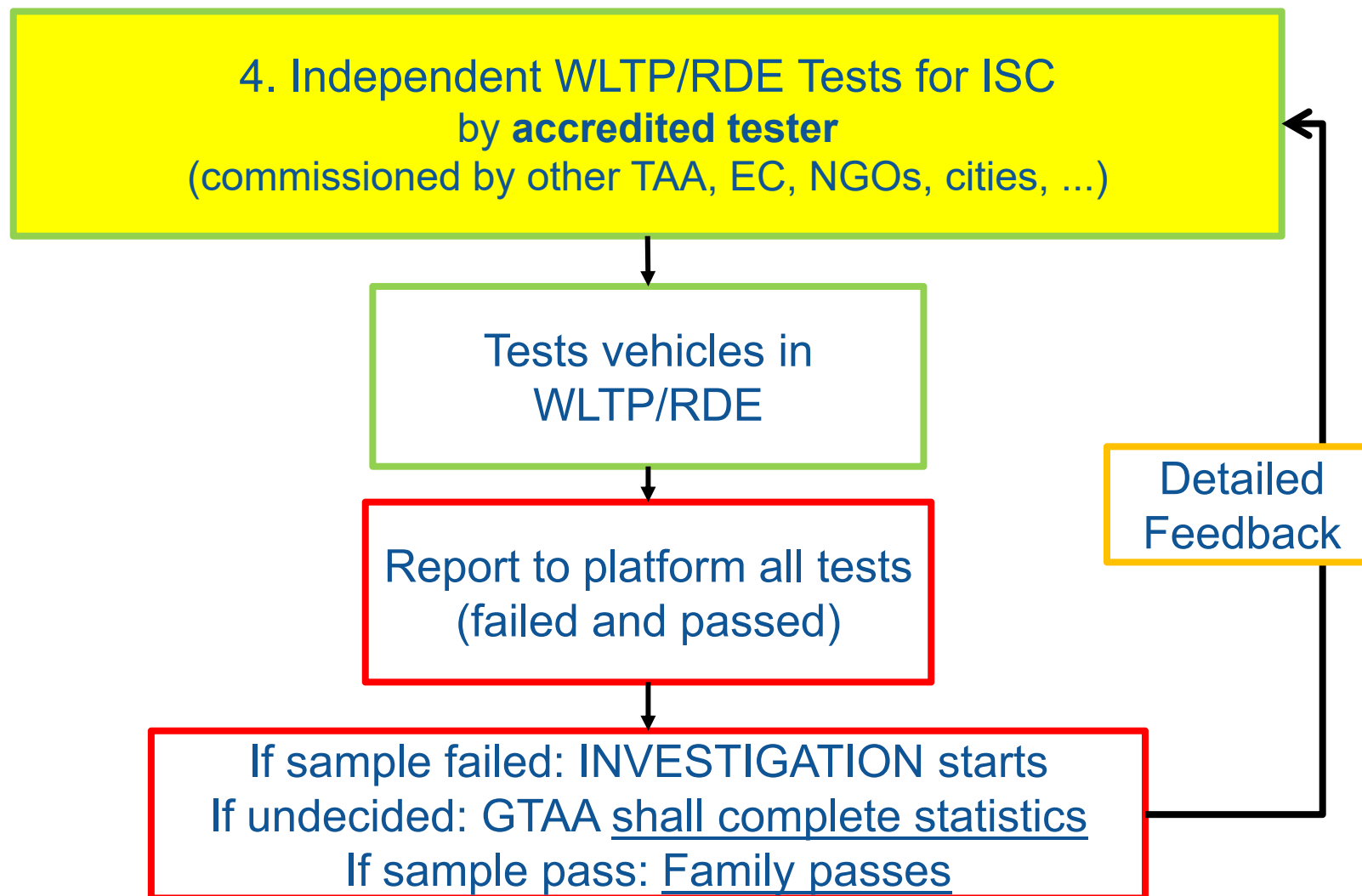
- Current system remains but the cycle now changes from NEDC to WLTC, on "PEMS families", and change in statistical procedure
- Mostly under control of manufacturer as before



## Part 3: GTAA testing



## New ISC-RDE procedure: Part 4: Independent Testing





## 3rd-party, independent testing

- PEMS Guidance should help to avoid misuse/misinterpretation of testing conditions
- Improved quality of emissions testing: accreditation requirements
  - Accreditation of labs executing the experiments (RDE/WLTP) with ISO 17025
  - Accreditation of inspection bodies with ISO 17020 for the ISC statistical procedure

If sample fails: INVESTIGATION starts  
GTAA handle investigation

## 5. Investigation

- When sample fails, then investigate what caused the issue GTAA+OEM (2 months)
- Was it really an issue or not?
- The details of the investigation shall be decided by GTAA, but will **undergo scrutiny**
  
- If yes, then OEM proposes fix, TA validates
- OEM to apply remedial measures

TAA investigates



5. Investigation of causes  
Possible Remedial Measures  
**By GTAA, OEMS**

## 6. Reporting

- Public report each year with results of ISC by TAA
- Direct feedback by GTAA in the Platform on the outcome of the investigations, including details
- Peer Review each year



6. Publicly Available Report





# **RDE package 4: in-service conformity testing new statistical procedure**



## Selection of vehicles

- Vehicles **between 15,000 km/6 months and 100,000km/5 years**
- Selection of vehicles from 2 MS with different conditions (fuels, ambient conditions, average road speeds and urban/highway split)
- No destructive tests allowed of vehicles tested by TAA, or independent testers
- *"shall select a sample of vehicles with sufficient mileage whose use under normal conditions can be reasonably assured"*

## **Selection of vehicles**

- Vehicle examination and interview with owner
- Only vehicles with good OBD data (fault code check before or after testing)
- Regular and appropriate maintenance (with proof)
- No indications of abuse
- No tampering
- No unauthorised major repair to engine or vehicle
- Check exhaust for signs of misfuelling
- No evident safety problems

|      |    |    |    |    |    |    |    |    |    |    |
|------|----|----|----|----|----|----|----|----|----|----|
| 10   |    |    |    |    |    |    |    |    |    | -1 |
| 9    |    |    |    |    |    |    |    | -1 |    | -1 |
| 8    |    |    |    |    |    | -1 |    | -1 |    | -1 |
| 7    |    |    |    |    | -1 |    | -1 |    | -1 | -1 |
| 6    |    |    |    | -1 |    | -1 |    | -1 |    | -1 |
| 5    |    |    | -1 |    | -1 |    | -1 | 0  | 0  | 1  |
| 4    |    | -1 |    | -1 |    | 0  | 0  | 0  | 0  | 1  |
| 3    | -1 |    | -1 |    | 0  | 0  | 0  | 0  | 1  | 1  |
| 2    | 0  |    | 0  |    | 0  | 1  | 1  | 1  | 1  | 1  |
| 1    | 0  |    | 1  |    | 1  | 1  | 1  | 1  | 1  | 1  |
| 0    | 1  |    | 1  |    | 1  | 1  | 1  | 1  | 1  | 1  |
|      | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |    |    |
| FAIL | 3  | 3  | 4  | 5  | 5  | 6  | 6  | 6  |    |    |
| PASS | 0  | 1  | 1  | 1  | 2  | 2  | 3  | 5  |    |    |

- Improved outlier treatment: 1 result with  $> 2.5$  or 2 results above 1.3 times the limit lead to an ISC sample fail!

- **Difference between RDE ISC and NEDC ISC testing**
  - **For laboratory tests**, conditions of the test are controlled. Deviations from TA emissions ("creep") during ISC are due to ageing (also production variability).
  - **For real-driving tests**, several test conditions can vary. The variability of RDE ISC emissions may be due to ageing and to differences in testing conditions. Variability due to testing conditions has to be managed within NTE margins to avoid ISC challenges.
  - The variability due to testing conditions cannot be absorbed by RDE ISC statistics → For RDE-compliant cars, improved real-world emission control (from Euro 6c) should bring lower variability.



# Next steps for RDE



## **RDE 4 close to finalisation**

- First draft already uploaded to CIRCA
- Final draft and MS vote at TCMV before the end of March 2018, publication in the OJEU by 2<sup>nd</sup> quarter of 2018

Some details about application dates still undecided

- No retroactive application of ISC changes
- Time is needed to assure adequate funds, access to vehicles, availability of accredited labs
- Administrative changes required (MS to adapt nat'l legislation, data exchange platform)
- Proposal must be consistent with parallel TA reform



**Thank you for your attention!**

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