**Editorial comments:**

The manuscript has been modified by the Science Editor to comply with the JoVE formatting standard. Please maintain the current formatting throughout the manuscript. The updated manuscript (54753\_R3\_051616.docx) is located in your Editorial Manager account. In the revised PDF submission, there is a hyperlink for downloading the .docx file. Please download the .docx file and use this updated version for any future revisions.  
  
1. Formatting: 5.3 should be split into two steps.

5.3 was subdivided in sub-steps  
  
2. The Protocol length exceeds 2.75 pg of highlighted material. At minimum, section 1 and 2 should not be highlighted for filming, as they contain the least filmable actions.

We reduced the length of the highlighted text to 2.5 pages  
  
3. Grammar:  
-Please copyedit the manuscript for numerous grammatical/typographical errors. Such editing is required prior to acceptance.

-Line 100 – “in detailed”

‘Detailed’ was correct to ‘detail’

-Line 184 – “refer the reader can refer”

‘Refer’ was removed

-2.1.6 – “checks remotely the PEMS status”

‘Checks’ replaced with ‘check’

-2.2.2 – “copilot’s sit”

Replaced with co-driver’s

-2.2.5 – “particles Avoid”

Full stop was added after particles

-2.3.2 – “an World”

A changed to ‘a’

-2.3.5 – “to fulfil with"

‘with; removed

-4.2 – “for 90%”

‘for’ removed

-Line 563 – It’s best not to use “shortly” to describe the protocol.

‘Shortly removed

-Line 567 – “independently by the vehicle”.

We changed the sentence to clarify that no connection to OBD is necessary

-Line 591 – “addition differences”

‘in addition’ replaced with ‘more’

-Line 598 – “conditions in a more robust and comprehensive”

Word ‘way’ was added after comprehensive

4. Visualization:  
-2.1.2, 2.1.3, 2.1.4 – It is unclear what actions should be filmed here. Where are the instruments/sensors and GPS placed? Is the GPS part of the car? These steps should not be highlighted if additional action/detail is not provided.

2.1 and subsections describe the parts of a PEMS. We removed the highlight of the complete section 2.1as the installation is described in section 2.2.

-2.2.9.1 – It is unclear what we could film here, so this step should not be highlighted.  
Text not highlighted in the new version

5. Additional detail is required:  
-2.1.1 – How are analyzers installed? What is meant by “driving severity?”

We rewrote this part as it created confusion: Use (at least) a NOx analyzer to determine the concentration of pollutants in the exhaust gas. Use a CO2 analyzer to determine later at the verification and calculations steps the driving severity for the normalization of the NOx emissions.

The installation will be described in section 4

-2.2.3 – What cables are connected to the PEMS main unit? What do they connect it to?

We added the ‘GPS signal cables to the ‘signal input port’ of the PEMS unit

-2.2.5 – How exactly is the tailpipe adapted? Please provide stepwise detail regarding what is attached to it and how.

Explanation was added: It can be done using hose clamps and flexible connectors or welding metal tubes.

-2.2.6 – How are the probes installed?

We added: The probes should have an appropriate length that permits sampling from the centerline. Probes with length equal to the inner diameter of the tailpipe can also be used if they have multiple holes along their length. For particle sampling a hatted probe is recommended in order to protect the instrument from bigger particles.

-2.2.7 – How are the lines heated?

We removed this step from this point and we moved it to point 4.1.1 when the PEMS is switched on, as it is part of the measurement equipment.  
  
6. Branding should be removed from step 2.2.1 – Teflon

‘Teflon’ was replaced with ‘Polytetrafluoroethylene (PTFE)’  
  
7. Discussion: Please include additional citations from independent investigators (that is, a different lab group) when discussing significance. The discussion currently has very few citations of any kind. Please also include independent citations in the introduction.

We added some references from independent researchers both in the introduction and in the discussion sections. As the topic is completely new it is extremely difficult to find studies on the topic. Thus most of them were presentations in conferences

**Reviewers' comments:**

**Reviewer #1:**  
*Manuscript Summary:*  
The paper provides much needed additional guidance on how to perform an on-road emissions test in compliance with the European Real-Driving emissions regulation. It is clearly written and logically structured. I recommend for it to be published in its current form.  
  
*Major Concerns:*  
N/A  
  
*Minor Concerns:*  
N/A  
  
*Additional Comments to Authors:*  
N/A  
  
  
**Reviewer #2:**  
*Manuscript Summary:*  
The article was interesting to read, mostly the part on the flow-meters.  
  
*Major Concerns:*  
The article provides more or less an annotated version of the RDE package 1 + 2. The article provides some but limited added value for scientists and other institutes that wish to apply RDE measurements. I recommend to include more illustrative examples and more illustrative experiences to make the article a more "best practice" document. This would maximize the added value of the article for the public that it's addressed to.

We added a few more examples regarding the driving dynamics concept. We also added in the introduction about the evaluation methods. We added in the discussion the difficulties finding the correct type approval reference CO2 values.  
  
*Minor Concerns:*  
N/A  
  
*Additional Comments to Authors:*  
N/A  
  
  
**Reviewer #3:**  
*Manuscript Summary:*  
N/A  
  
*Major Concerns:*  
\*The RDE procedure contains some not so intuitive approaches in calculating the emissions and verifying the validity of the driving conditions. Therefore it would be very valuable if:

o The application of the two calculation approaches (moving average window and power bins methods) is illustrated and the results compared. At least the verification of the equivalency of the two methods with the experimental results is important since both methods are allowed

The topic is out of the scope of the paper, as we want only to show the experimental and calculations part. Nevertheless we added a few references that compared the two methods. We also added a sentence mentioning that the comparison of the two methods is a topic for revision.

o Some examples are given in which the trip is invalid (too aggressive driving or too smooth driving) and how the methodology captures such driving behaviors.

We also added a few examples in the results section with aggressive driving with the same car and some found in the literature. Unfortunately there is not much data on this topic.

\*Line 604: "On-road emission measurements are thus subject to larger uncertainty margins (estimated to be maximum of 20-30% at the applicable emission limit)…". Does this apply to all pollutants or are you referring to NOx only? This seems a strong statement which should be backed up with more experimental data or at least citations to published work on the subject.

We clarified that this applies to NOx. We also added a reference where this number was based on.  
  
*Minor Concerns:*  
\*Line 100: "… described in details"

‘s’ removed

\*Line 184: "… of the RDE test procedure the reader can refer …"

Second refer was removed

\*Line 333: "… and local elevation with respect to the see level …"

We changed ‘’ to ‘;’ in order to improve the readability of the sentence

\*Line 472: "… Thus, the selected vehicle was already available …"

‘a’ after ‘selected’ was removed  
  
*Additional Comments to Authors:*  
The paper seems nothing but a synopsis of the RDE specifications. I can hardly see any technical progress in it, on the other hand the paper does a lot of explicit marketing for one specific manufacturer of PEMS systems.

 We had to choose one manufacturer for clarifying the procedure. In the revised version we added one photo of the rest manufacturers and we removed one photo of the manufacturer we are using as an example.