NHTSA

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

GTR No. 20 EV Safety

IWG #25 – Summary of Vehicle Level BMS Tests on Commercially Available Vehicles

November 2022

Vehicle Level BMS Tests

- ***Objective***: to develop an easy and practical approach to conduct BMS tests at the system level.
  - System level tests ensure there are no interference with other vehicle controls.
    - Example: For EVs, regenerative braking and SOC may impact AEB performance.
- Laboratory test procedure was developed and performed on:
  - 2019 Chevrolet Bolt
  - 2020 Nissan Leaf S Plus
  - 2020 Tesla Model 3
- Three GTR No. 20 sections were evaluated:
  - Section 5.1 – In-Use Electrical Safety Requirements,
  - Section 5.3 – Installation & Functionality of REESS, and
  - Section 5.4 – REESS In-Use Requirements.

Key Take-aways

- In each case, the BMS terminated the test in accordance with the requirements of the GTR No. 20 standard.
  - No failure modes were observed during this test series.
- Based on the series of tests performed, vehicle-level tests are easy and practical to perform.
  - All tests were performed with a breakout harness.
    - Exception: Over-Temperature Test was performed on the chassis dynamometer.
  - Easier than extracting a pack from the vehicle along with BMS which may not be integrated.
  - Questionnaire for manufacturer standardizes the information needed to perform the tests.
  - Non-destructive evaluations → vehicle can be used for other testing with minor resetting (e.g., fuse replacement after external short-circuit test).

Links to the Reports

- Each report can be accessed via the links below:
  - GTR No. 20 Evaluation of Chevy Bolt
  - GTR No. 20 Testing of a 2020 Nissan Leaf S Plus (62 kWh Battery) 5-Door Hatchback
  - GTR No. 20 Testing of a 2020 Tesla Model 3 Standard Range 4-Door Sedan