

# FTA

FEDERAL TRANSIT ADMINISTRATION

## **FTA Bus Testing Review Process and Planned Improvements October 11, 2019**

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FTA Bus Testing Program Manager



U.S. Department of Transportation  
Federal Transit Administration

# FTA Testing Requirements Determination Legacy Process

1. Receive and log request – typically received from a transit vehicle manufacturer (TVM), but sometimes from a bus dealer, supplier, or grantee. All requests for determinations of Bus Testing requirements and/or requests for authorization to begin full or partial testing are emailed directly to the FTA Bus Testing Program Manager for review and official response. These requests should (but do not always) provide:
  - a. A detailed description of the new or modified bus model.
  - b. The service life category of the bus.
  - c. Engineering documentation characterizing key attributes of the new bus model, or engineering documentation of all major changes to the previously-tested bus model.
  - d. Documentation that demonstrates satisfaction of each one of the testing requirements outlined in section 665.11(a) [a checklist table is provided at <https://www.transit.dot.gov/research-innovation/bus-testing-determination-and-authorization-process>].
2. FTA staff manually sends confirmation of receipt to sender.
3. FTA staff performs initial review of inquiry:
  - a. Is inquiry a request for a testing requirements determination, a testing authorization, or both? Is it a more complex issue?
  - b. Follow up with sender if information is lacking and/or unclear.
  - c. Forward submission for technical review, if needed.
4. Gather and organize information needed to prepare response. Depending on the complexity of the inquiry, this may include:
  - a. Information provided initially by submitter.
  - b. Supplemental information provided by submitter (on their own or in response to FTA request).
  - c. Results of technical review.
  - d. Stated FTA policies (Regulations, Circulars, testing authorization checklist, websites, Dear Colleague letters, etc.).
  - e. Review of similar precedents in our files.
  - f. Discussion with Bus Testing team members.
  - g. Additional research.
5. Draft a response letter stating FTA’s determination and the rationale behind the determination.
6. Submit draft response letter to TCC for review and concurrence, if needed:
  - a. Until very recently, TCC review and concurrence was sought for most testing requirements determinations and for questionable authorizations to begin testing. TRI has just begun evaluating a workflow that does not routinely involve TCC.
  - b. For routine authorizations to initiate testing, TCC review is usually not necessary because TCC has approved the overall process and checklist.
7. If the draft response was sent to TCC for review, address TCC questions, changes, and/or concerns in order to receive TCC concurrence.
  - a. TCC usually concurs, sometimes with suggested edits; proceed to next step.
  - b. Iterate with TCC and/or technical team in complex cases in order to obtain concurrence.
8. Prepare, sign, send, log, and archive final response letter.

# FTA Determinations of Partial Testing Requirements (highlights)

- TVMs email FTA (Marcel) with description of the changes – level of detail provided varies from two vague sentences to 3-ring binders
- FTA, and often Booz-Allen, review and evaluate:
  - Technical details of the original and modified bus models and major components
  - Applicable statutes, regulations, and FTA policies and guidance
  - Records of prior determinations, seeking similar precedents
- FTA drafts a letter documenting:
  - Key facts submitted by TVM
  - Additional facts and findings from FTA's analysis
  - FTA's determination of testing required
- FTA Counsel reviews draft letter and provides concurrence, edits, and/or concerns
- FTA prepares and emails final determination to TVM

# Process for TVMs to Request FTA Authorization to Begin Testing

- TVM provides information required ([checklist](#) on FTA website), including:
  - Bus configuration, major components, and metrics
  - Description of major changes from previously-tested model(s), if applicable
  - Service life category the bus is to be tested in
  - Evidence of regulatory compliance
  - Standee capacity
  - Certification that test bus represents production configuration
  - Manufacturing origin (country) of major components
- FTA reviews information (iterating with TVM, if needed) and issues letter authorizing bus to begin testing

# Sample Determination and Authorization Letter

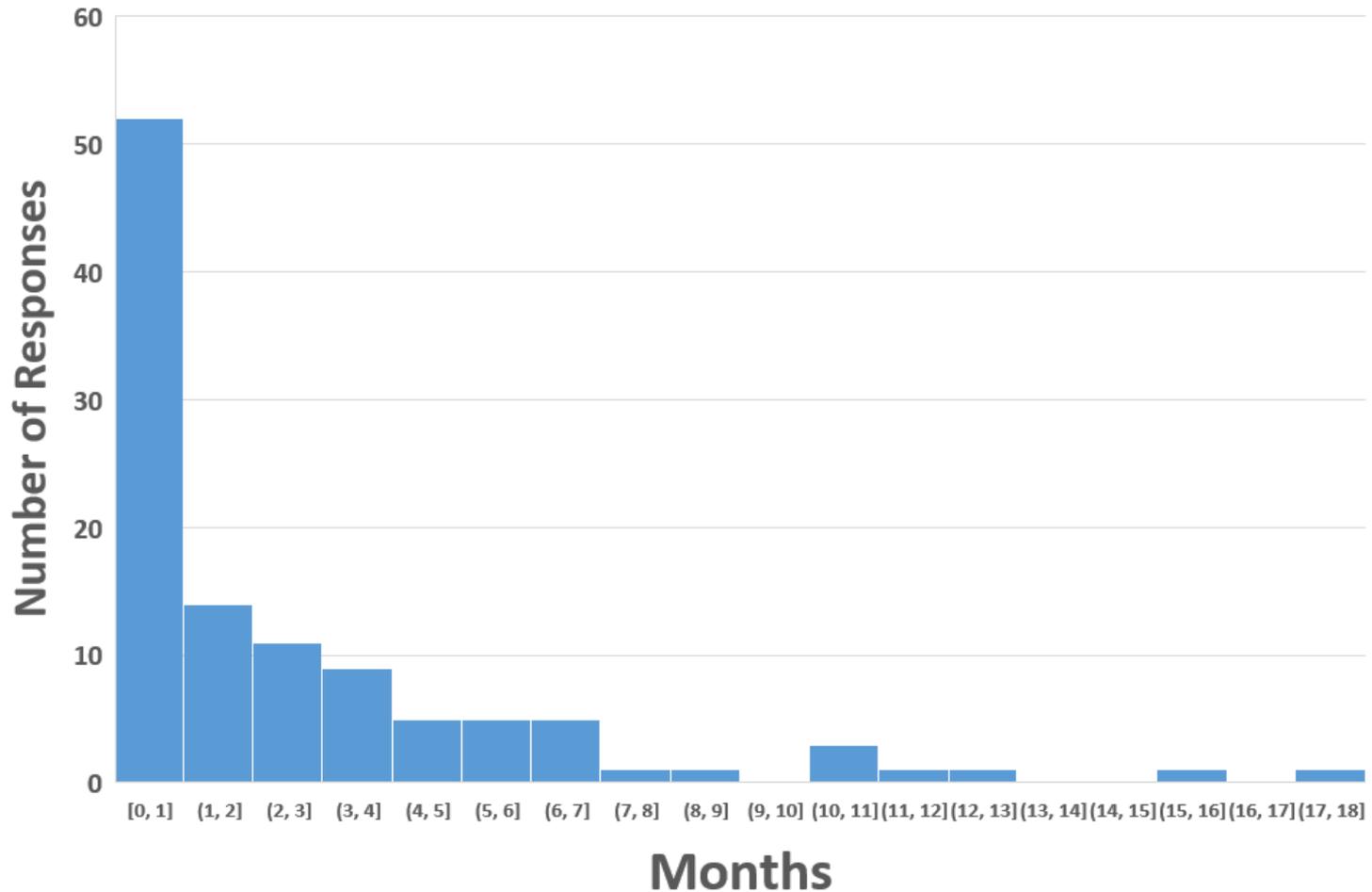
<p style="text-align: center;">    <b>U.S. Department of Transportation</b>  <b>Federal Transit Administration</b> </p> <p style="text-align: right;"> <small>2019 New Jersey, Portland, OR              Washington, DC 20590</small> </p> <p style="text-align: center;">             June 7, 2019         </p> <p>             Sylvain Chabot, P. Eng., PMP              Product Safety &amp; Regulatory Compliance Manager              Nova Bus, Private              1000 Industrial Blvd.              Sorel-Traroch, QC, J7R 1A5 Canada              (443) 466-7777    <a href="mailto:stchabot@novabus.com">stchabot@novabus.com</a> </p> <p>             Dear Mr. Chabot:         </p> <p>             This is in response to your email and attachments dated April 1, 2019, in which you requested assistance from the Federal Transit Administration (FTA) concerning the applicability of the Bus Testing Regulations (49 CFR Part 605) to the LAM4 bus model manufactured by Nova Bus. Your submission states that:         </p> <ul style="list-style-type: none"> <li>The Nova Bus LAM4 bus model combines the standard LFS bus platform with a RAE Systems diesel hybrid-electric Series-ER HybridDrive propulsion.</li> <li>The 40-foot structure configuration is similar to the L200 LFS battery-electric (L1T-BT-R170) and LFS L716 CNG (L1T-RT-9110) bus models.</li> <li>The hybrid propulsion system from RAE Systems is similar to the one tested on a 40-foot Nova Bus L700 (type L1T-RT-R122). It is also similar to the powertrain tested on a 40-foot New Flyer XDE40 (F15-B1-R1015).</li> <li>The LAM4 model is equipped with an ISS-30-32k battery that enables fully electric travel for short distances.</li> <li>Nova Bus believes that the LAM4 seat structure loading is below the worst-case scenario allowed in the L716 structure. Nova Bus believes that the impact of an addition of 300 kg compared to the latest L200 test is minimal.</li> </ul> <p>             You have asked FTA to determine partial testing requirements for the LAM4 bus model, and authorize the LAM4 to begin any required testing.         </p> <p>             FTA has reviewed your request and accompanying documentation and has determined that Partial Testing will be required for the Nova Bus LAM4 bus model, specifically, the Performance, Fuel Economy (Energy Efficiency and Range), Noise, and Emissions tests will be required. Our rationale for this determination is as follows:         </p>	<p style="text-align: center;">-2-</p> <ul style="list-style-type: none"> <li>The Nova Bus L200 LFS bus model has completed full testing at the Alabaster Bus Testing Center and received a passing score (Report No. L200-RT1703). Consequently, variants of the L200 LFS, such as the proposed LAM4, are eligible for Partial Testing procedures, only those items in which we would expect to obtain significantly different data would need to be repeated.</li> <li>The roof structures of the previously-tested Nova Bus L716 CNG-powered bus and the LAM4 appear to be essentially identical. No failures were observed in the roof or adjacent structure of the L716 (Report No. L716-RT-91319) despite being tested with a roof-mounted load 44 percent greater than the proposed roof-mounted load on the LAM4. Therefore, we would not expect to obtain significantly different data from repeating the Structural Integrity and Reliability tests on the LAM4. The finite-element analysis included with your submission supports this conclusion. Additional Reliability data on the RAE Systems HybridDrive powertrain in a similar Nova Bus model is available in Report No. L716-RT-91612 on the L700 40-foot bus.</li> <li>The RAE Systems HybridDrive propulsion system is integrated similarly to the 40-foot Nova Bus L700 bus model, which had no significant assembly issues. Therefore, we would not expect additional testing of the LAM4 to reveal significantly different data in the Maintainability tests compared to the data in Report No. L716-RT-91612.</li> <li>The L716, with significantly more weight on the roof, performed the Safety test with no issues. Therefore, we would not expect to obtain different data than performing the Safety test on the otherwise-similar LAM4 with significantly less weight on the roof.</li> <li>The RAE Systems HybridDrive Series-ER powertrain is equipped with a higher capacity (31.8 kWh) ISS-30-32k Lithium Nickel Manganese Cobalt battery that enables stop-start operation and the ability to reach up to 75 percent of daily miles on electric power alone (<a href="http://www.novabus.com/vehicles/engines">http://www.novabus.com/vehicles/engines</a>). This configuration has not been tested by the Bus Testing Program, so we would expect to obtain significantly different data in the Performance, Fuel Economy (Energy Efficiency and Range), Noise, and Emissions tests.</li> </ul> <p>             Partial test reports are valid only in connection with a baseline full testing report. Therefore, the appropriate baseline report, L716-RT-91793 on the L200 LFS, must be provided to FTA in connection with the partial test report resulting from the specified testing of the LAM4. Bus Operators are encouraged to review the sections of the other reports cited above for additional useful information on bus models similar to the LAM4.         </p> <p>             This determination is based on the information and representations in your submission as mentioned above. If Nova Bus makes any other changes to the vehicle, additional testing may be required.         </p> <p>             Your letter also requested authorization to perform any testing required, and provided the following information to support your request:         </p>
<p style="text-align: center;">-3-</p> <ul style="list-style-type: none"> <li>The Nova Bus LAM4 bus model (VIN: 2N1V1K2L310759809) is being submitted for Partial Testing, specifically, the Performance, Fuel Economy (Energy Efficiency and Range), Noise, and Emissions tests.</li> <li>The LAM4 combines Nova Bus' previously-tested 40-foot low-floor rear-engine LFS platform with RAE Systems HybridDrive Series-ER diesel hybrid-electric propulsion.</li> <li>The weight and passenger ratings of the test bus are:             <ul style="list-style-type: none"> <li>• Curb weight: 11,502 pounds</li> <li>• Front axle weight rating: 14,000 pounds</li> <li>• Rear axle weight rating: 28,000 pounds</li> <li>• Gross vehicle weight rating: 42,833 pounds</li> <li>• Passenger capacity: 37 seated passengers, 12 standing, plus driver. Two convertible wheelchair positions (places two seated passengers each when in use).</li> </ul> </li> <li>Nova Bus has provided evidence that the bus complies with NHTSA requirements at 49 CFR Parts 566, 568, and 587.</li> <li>Nova Bus has certified that the bus complies with all applicable Federal Motor Vehicle Safety Standards (FMVSS).</li> <li>Nova Bus has submitted its Disadvantaged Business Enterprise (DBE) goals to FTA.</li> <li>Nova Bus has stated that the bus to be tested is substantially fabricated and assembled using the subchassis, roofing, and materials that will be used in production of subsequent buses of that model.</li> <li>The manufacturing points of origin of major components of the test bus are:             <ul style="list-style-type: none"> <li>• Bus structure – Canada</li> <li>• Axles – Germany</li> <li>• Front/rear brakes – Germany</li> <li>• Propulsion power system and auxiliary power systems:                 <ul style="list-style-type: none"> <li>• Tractor motor – USA</li> <li>• Tractor batteries – USA</li> <li>• Transmission/gearbox – USA</li> <li>• Fuel tank – USA</li> <li>• Fuel injectors and manifold – USA</li> <li>• Fuel injectors electronic control unit – USA</li> </ul> </li> </ul> </li> </ul> <p>             We have reviewed your request and accompanying documentation and based on the information you provided, FTA authorizes the Nova Bus LAM4 bus model to begin Partial Testing, specifically, the Performance, Fuel Economy (Energy Efficiency and Range), Noise, and Emissions tests. The Alabaster Bus Testing Center will need a copy of this letter in order to begin testing.         </p>	<p style="text-align: center;">-4-</p> <p>             If you require any further assistance with this or other matters concerning this Testing, I encourage you to consult the resources provided at <a href="http://www.fta.gov/about-us/assistance-technical-support">www.fta.gov/about-us/assistance-technical-support</a>. If you still have questions after checking this website, please feel free to contact me.         </p> <p style="text-align: right;">             Sincerely,                Manfred Schlegel              Bus Testing Program Manager              Office of Infrastructure &amp; Asset Management              FTA-20  <a href="mailto:mschlegel@dot.gov">mschlegel@dot.gov</a>              202-366-0723         </p> <p>             Eto: Dariusz Khabarovsk, Director, Bus Research and Testing Program              Jennifer Lago, Jennifer Hall, Alabaster Bus Research and Testing Center              Eronneville Trautman, VP Legal and Public Affairs, Nova Bus         </p> <p style="text-align: center;"> <small>© 2019 FTA/US DOT/Nova Bus. All Rights Reserved. All information is provided under FOIA.</small> </p>

# Pros and Cons of Legacy Process

- Rigorous
- Thorough
- Accurate
- Consistent
- Several levels of review
- Continuity of practice
- Wide variations in TVM-submitted information
- Labor-intensive
- Time-consuming
- Likelihood of disruption before a determination is completed, requiring re-work

# FTA Response Time – Legacy Process

Bus Testing Inquiry Response Times (9/16/16 - 7/25/18)



# Interim Steps to Streamline FTA Review Process

- Simplified FTA response template
  - Reference attached TVM info, rather than repeat it
  - Tabular determination format with minimal explanation
  - Explicitly cite prior Bus Testing Report(s) that provide data to support partial testing
  - Per 49 CFR 665.7(b), “recommend” specific tests, rather than “require”
  - One-sentence authorization (if supplied info adequate)
- FTA Counsel has approved template and process, and will not need to routinely review and concur

# Simplified FTA Response Template



U.S. Department  
of Transportation  
Federal Transit  
Administration

1200 New Jersey Avenue SE  
Washington, D.C. 20590

August 26, 2019

John Doe  
Chief Engineer  
BusCo  
(via email: [JD@busco.com](mailto:JD@busco.com))

Dear Mr. Doe:

This is in response to your August 15, 2019 submission in which you requested assistance from the Federal Transit Administration (FTA) concerning the applicability of the Bus Testing Regulation (49 CFR Part 665) to the BusCo Eagle battery-electric bus model. Your submission asked FTA to recommend the Bus Testing requirements for this bus model and authorize this bus model to begin any recommended testing at the Bus Testing Center.

The rationale for our recommendation below is based on the information and representations in your attached submission, which is incorporated by reference.

FTA Recommendation of Testing Required (49 CFR § 665.7(b) places responsibility for determining testing requirements of a bus model on the recipient of FTA grant funds)	
<b>PARTIAL TESTING</b>	
1.1 - Accessibility of components and subsystems	YES – change from diesel to battery-electric drive will result in significantly different data
1.2 - Servicing, preventative maintenance, and repair and maintenance during testing	YES – change from diesel to battery-electric drive will result in significantly different data
1.3 - Replacement and/or repair of selected subsystems	YES – change from diesel to battery-electric drive will result in significantly different data
2 - Reliability	YES – integral part of Structural Durability test
3.1 - Double lane change (obstacle avoidance)	No – added battery weight is under the floor, lowering CG
3.2 - Braking performance	No – substantially similar to Hawk (LTI-BT-R1234)
4 - Performance and gradeability	No – substantially similar to Hawk (LTI-BT-R1234)
5.2 - Structural distortion	No – substantially similar to Hawk (LTI-BT-R1234)
5.3 - Static towing	No – substantially similar to Hawk (LTI-BT-R1234)
5.4 - Dynamic towing	No – substantially similar to Hawk (LTI-BT-R1234)
5.5 - Jacking	No – substantially similar to Hawk (LTI-BT-R1234)

- 2 -

5.6 - Hoisting	No – substantially similar to Hawk (LTI-BT-R1234)
5.7 - Structural durability	YES – change from diesel to battery-electric drive will result in significantly different data
6 - Fuel Economy (Energy efficiency and range)	YES – change from diesel to battery-electric drive will result in significantly different data
7.1 - Interior noise and vibration	YES – change from diesel to battery-electric drive will result in significantly different data
7.2 - Exterior noise	YES – change from diesel to battery-electric drive will result in significantly different data
8 - Emissions	No – zero-emission vehicle

FTA authorizes the Eagle to begin the tests indicated above in the 10-year/350,000-mile service life category.

FTA has based this recommendation and authorization on the information and representations detailed in your submission or referenced above. If the bus is not as represented and/or if BusCo makes any other changes to the vehicle, this recommendation and authorization may no longer be valid.

If you require any further assistance with this or other matters concerning Bus Testing, I encourage you to consult the resources provided at [www.transit.dot.gov/research-innovation/bus-testing](http://www.transit.dot.gov/research-innovation/bus-testing). If you still have questions after checking this website, please feel free to contact me.

Sincerely,

Marcel Belanger  
Bus Testing Program Manager  
Office of Infrastructure & Asset  
Management  
TRI-20  
[marcel.belanger@dot.gov](mailto:marcel.belanger@dot.gov)  
202-366-0725

Cc: David Klinikowski, Director, Bus Research and Testing Program  
Jennifer Lego / Jennifer Noll, Altoona Bus Research and Testing Center

Attachments: August 15, 2019 BusCo letter  
BusCo Eagle specifications

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# Ways TVMs Can Help

- Include all needed information (checklist)
- Avoid sending large quantities of unfiltered and/or unneeded information
- Use a descriptive subject for your email
- Keep unrelated inquiries separate (start a new email)
- At least provide us a key if it's not possible to:
  - Use different model names for different vehicles
  - Avoid selling essentially the same bus under different model or manufacturer names

# Web-Based Submission, Response, and Tracking System

- Currently in development
- Applies to both determinations and authorizations
- TVMs will use a web-based portal to enter prompted data on a bus model
- FTA will respond directly on the form
- TVMs and FTA will be able to track status



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