



ACOUSTIC TESTING:

Pass-By Noise Testing



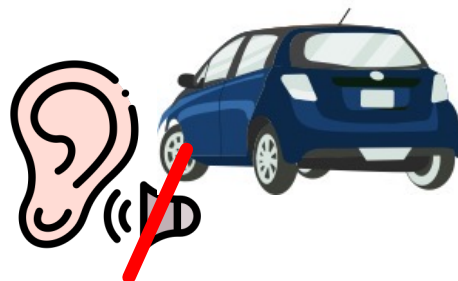
ACOUSTIC TESTING

Acoustic Testing is performed to determine if material can resist the specified Acoustic environment. It must resist this environment without degradation of its functional performance and/or structural integrity. Acoustic Testing or Acoustic Emission Testing is the measurement of sound emissions radiating from the equipment under test.

In other words, **how loud is the equipment.**

To control vehicle noise emissions, vehicle manufacturers are required to measure Pass-By Noise according to the regulations to ensure that their vehicle ***noise** emissions are within the prescribed limits. The regulations are coordinated by the United Nations Economic Commission for Europe Working Party on Noise and Tyres for its 56 member States in Europe, North America and Asia.

* Noise is unwanted sound or unwanted disturbance in an electronic signal. Acoustic noise is energy transmitted to the air that causes an audible disturbance.





In urban areas, traffic noise can be a prominent source of discomfort, affecting the daily lives of millions of people and potentially diminishing their health and well-being.

To create a more harmonious living environment and reduce the risks of noise exposure, legislators are working on establishing acceptable emission levels and imposing limits on pass-by noise (PBN) levels.

Pass-By Noise Testing

Pass-By Noise (**PBN**) Testing is a standard procedure that was developed in response to the creation of the International Organization for Standardization (ISO) 362 standard and the United Nations Economic Commission for Europe (UN/ECE) Regulation 51.

It measures vehicle emission levels on an exterior test track.

The results are used to certify that vehicles comply with establish standards. This type of certification is required for all types of road vehicles, including trucks, buses, motorcycle, passengers cars and recreational vehicles.

For hybrid and electric vehicles, new standards are in place for measuring minimum noise emission. For these vehicles an acoustic vehicle alert system (AVAS) adds exterior noise to ensure pedestrian safety.



Comprehensive Solutions For Pass-By Noise Testing

Pass-by noise engineering includes the automotive original equipment manufacturer (OEM) strategy of having a final vehicle prototype successfully pass the test: setting PBN targets, predicting PBN levels in the early design phase, assessing the contribution of individual noise contributors and conducting the final approval test.

Simcenter Testlab for exterior pass-by noise from Siemens Digital Industries Software can be configured for dedicated user-defined procedures and specific requirements.

Two typical configurations for standard PBN testing are available:

Track-based exterior pass-by noise in which Simcenter SCADAS for data acquisition is placed near the test track

In-vehicle exterior PBN in which Simcenter SCADAS is placed in the vehicle to acquire additional measurement channels for more in-depth analysis



A Complete Set of Sensors

A single Pass-By Noise system can be used in both configurations. Testing teams can easily swap or combine configurations for advanced tests. For techniques such as ASQ or subsystem masking, large amounts of data must be captured near the track and on the vehicle.

The exterior Pass-By Noise solution has a complete set of sensors, including speed radar or Global Positioning System (GPS) speed sensors, track-based light barriers, optical engine speed and kickdown sensors, a weather station and wired or wireless microphones.

All sensors are conditioned with dedicated Pass-By Noise modules in Simcenter SCADAS Mobile hardware. The sensors are powered directly by Simcenter SCADAS Mobile without requiring any additional external power supply.

Modular Hardware For Reliable Data Acquisition

The centerpiece of the solution is the Simcenter SCADAS Mobile Pass-by Noise Conditioner module, a dedicated two-slot module that features high-quality integrated signal conditioning. This module conditions sensor inputs and delivers outputs for all sensors. By using telemetry, all sensors are synchronized with track and vehicle sides. Standalone wireless microphone conditioner units provide a high-speed data link for the moving vehicle and are used for in-vehicle configuration.

This expanded portfolio provides maximum efficiency and is easy to deploy and use. The Simcenter SCADAS Mobile Pass-by Noise Conditioner module is suitable for testing on standard configuration types such as track-only, track-based and in-vehicle.

The postprocessing software reflects the same user-centric approach. Increased testing and shorter development timeframes can make documenting and reporting results a burden. Thanks to the PBN application, data and reports can be easily archived, retrieved and compared.

To support permanent outdoor installations, standard hubs are installed at trackside. These provide local connection points for track sensors, such as light barriers and support transport, over long cables to a measurement cabin outside the mandatory obstacle-free area. In the cabin, the lightning-strike-protected unit connects





Simcenter SCADAS

Versatile Acoustic and Sound Quality Testing

From the signal conditioning of microphones and interfacing with digital heads to the acquisition of sound power levels, real-time octaves and the latest high-tech tools for sound quality engineering, Simcenter Testlab Acoustics helps you conform to the latest international standards and engineering practices.

By directly addressing a wide variety of test-based acoustic engineering challenges that you face on a daily basis, combining Simcenter SCADAS with Simcenter Testlab Acoustics offers a complete and unique solution for acoustics testing and analysis in specific domains, such as straightforward acoustic analysis, material and component testing, sound power and Pass-By Noise testing, sound source localization, vibroacoustic engineering and sound-quality and brand-sound engineering.



To learn more about using our **Simcenter SCADAS for Acoustic Testing** for your Automotive Testing, please click [here](#) →

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