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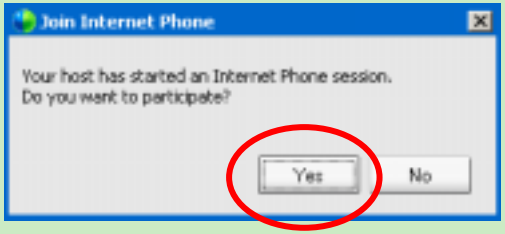

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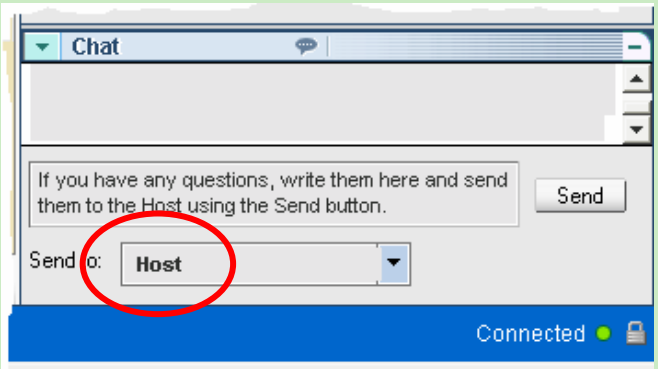

Starting in 10 Minutes

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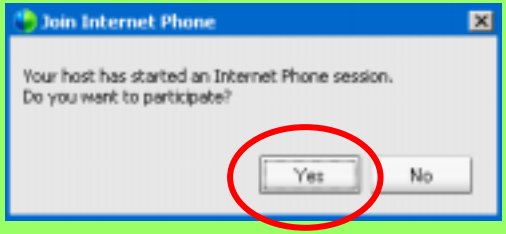

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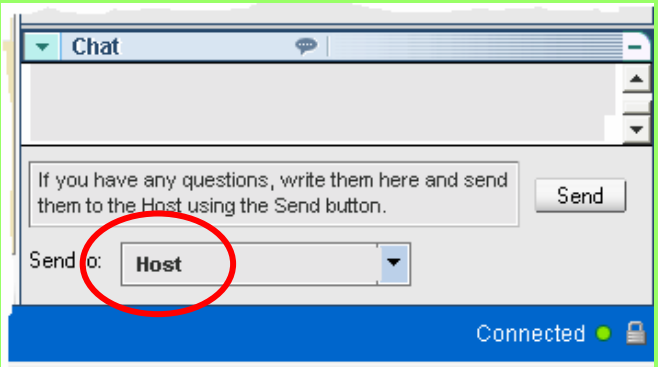

Starting in 5 Minutes

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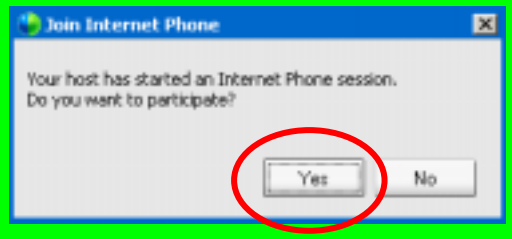

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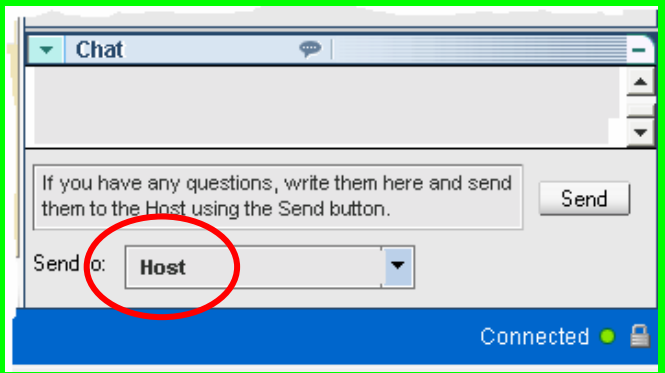

Starting in 1 Minute

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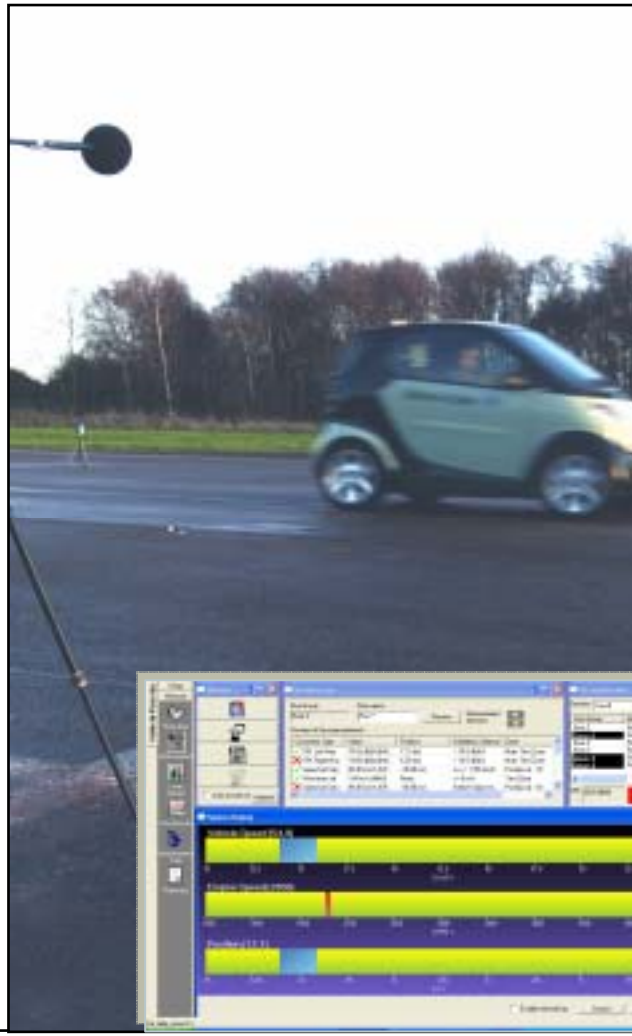
Vehicle Pass-by

New ISO 362 ECE Reg 51 draft



- Does your system comply?

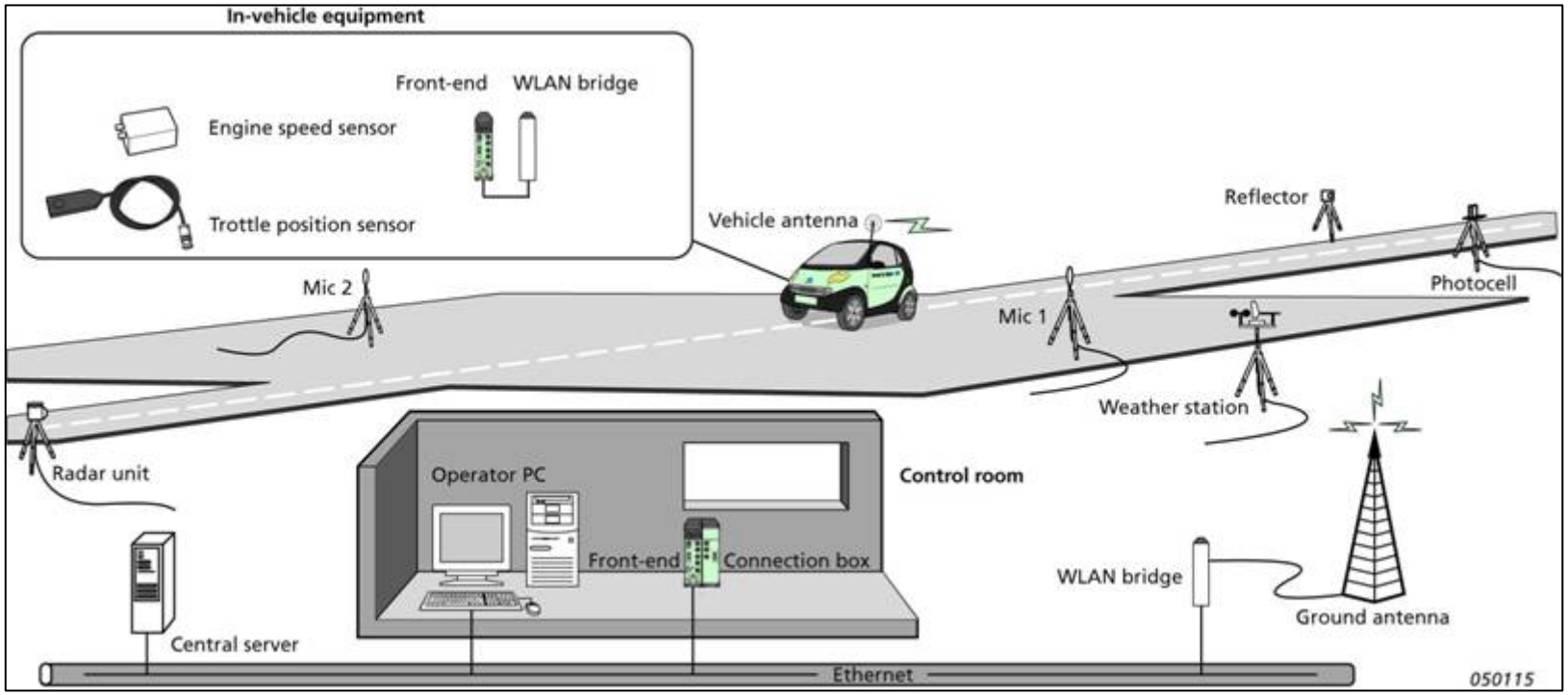
Your Hosts/Tutors – A Adebusuyi

- ***Industry Manager, Brüel & Kjær Automotive Team***
- ***Joined Brüel & Kjær in 1997***
- ***B Eng Mechanical Engineering (Vehicle Option)***

Previously:

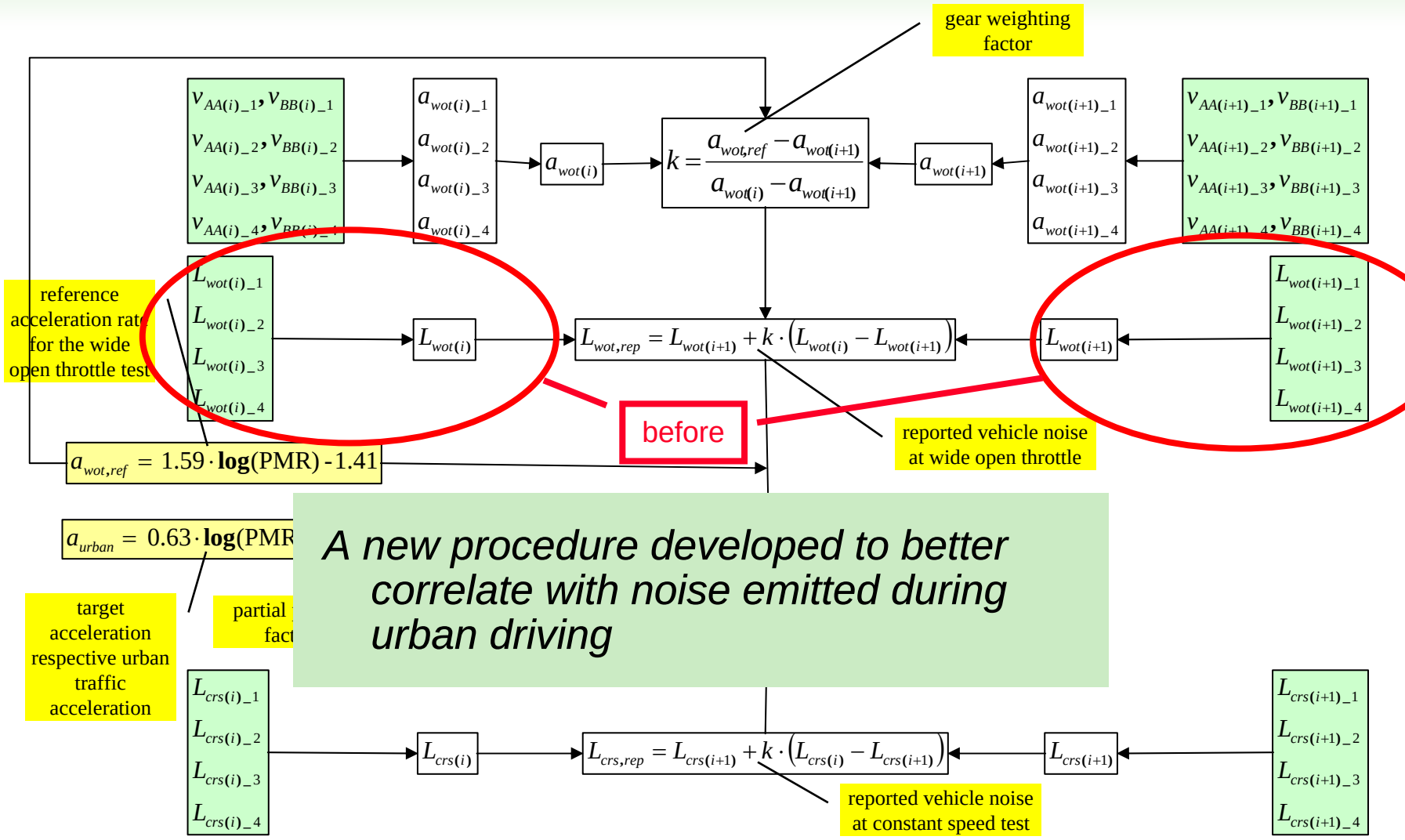
- Body and trim designer Bertrandt AG
- Commercial vehicle body designer Marshall SPV

Typical Pass-by Setup



- Measures **exterior noise of a vehicle during operation** along with vehicle operating parameters and external conditions (e.g., vehicle speed, vehicle position, engine speed, ambient temperature, windspeed etc…)

ISO 362 and its Latest Revision



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New test procedure in more detail

- Two tests
  - Acceleration test
    - *Four runs averaged = $L_{wot\ avg}$*
    - *Weighted according to gears used and reference acceleration*
  - Constant speed test
    - *Four runs averaged $L_{crs\ avg}$*
- Uses existing test site layout
- $L_{urban} = L_{wot\ avg} - k_p*(L_{wot\ avg}-L_{crs\ avg})$
  - L_{urban} = Vehicle pass-by value
  - K_p = Partial power factor
    - *Ratio of typical urban acceleration to measured acceleration*

Procedure Current ISO 362

Calculate Power to Mass ratio for vehicle

Choose gears for testing **(Typically 2 & 3 unless a supercar or Lexferrari)**

Do 4 runs in chosen gear(s) with entry speed of 50km/h

Calculate the noise level for urban driving

Procedure Revised ISO 362

Calculate Power to Mass ratio for vehicle

This combined with the vehicle type M1, M2 or N1 or N2 determines the reference acceleration required

Find reference acc. $a_{wot,ref}$ for the acceleration test

Target 1: correct acceleration determined by chosen gear

Target 2: 50km/h at position 0 determined by entry speed

Do test runs for acc measurement to find correct gear(s) to use and correct entry speed

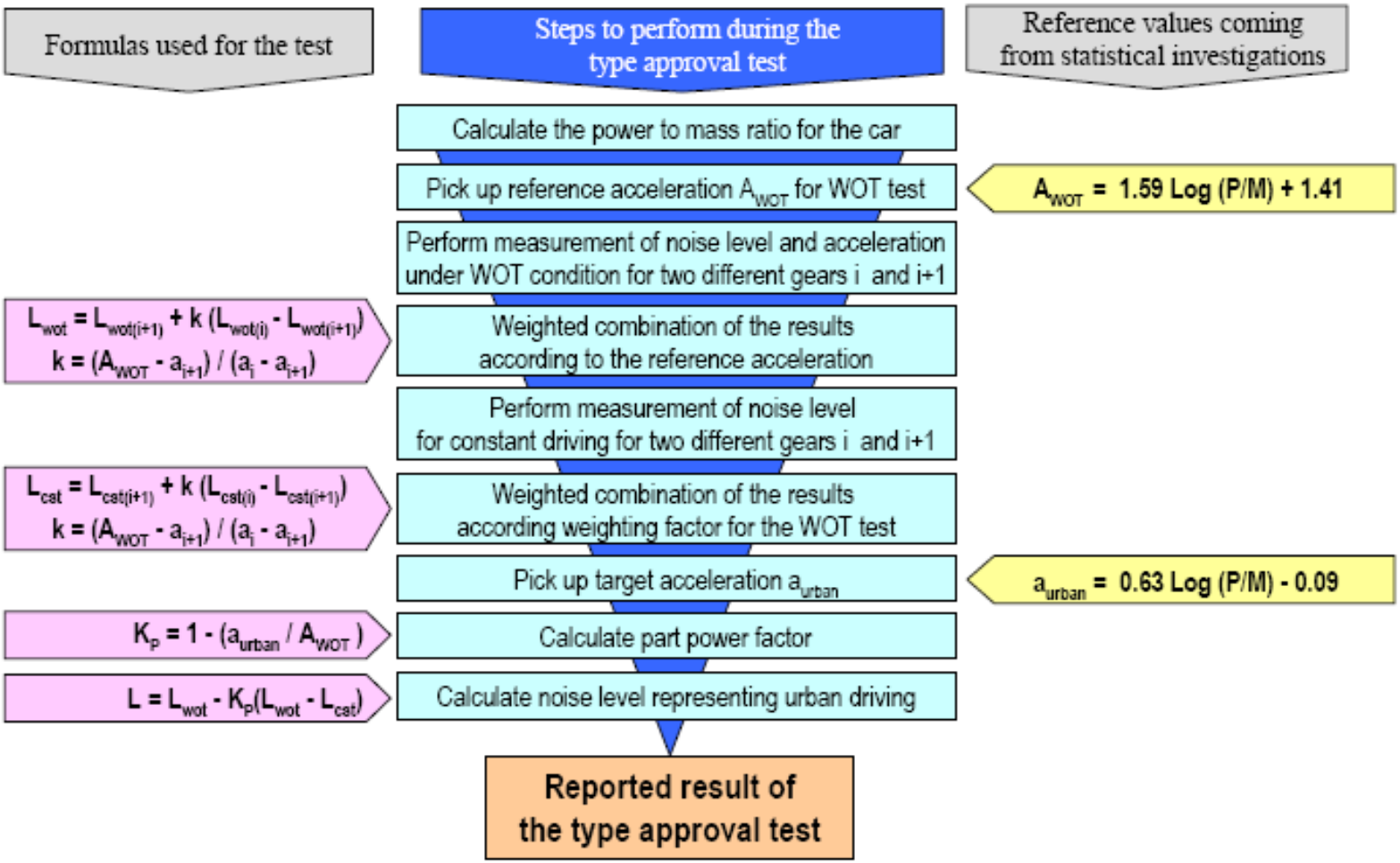
Do acc measurement runs in selected gear(s)

Calculate results (weighted result according to reference acc and gears used)

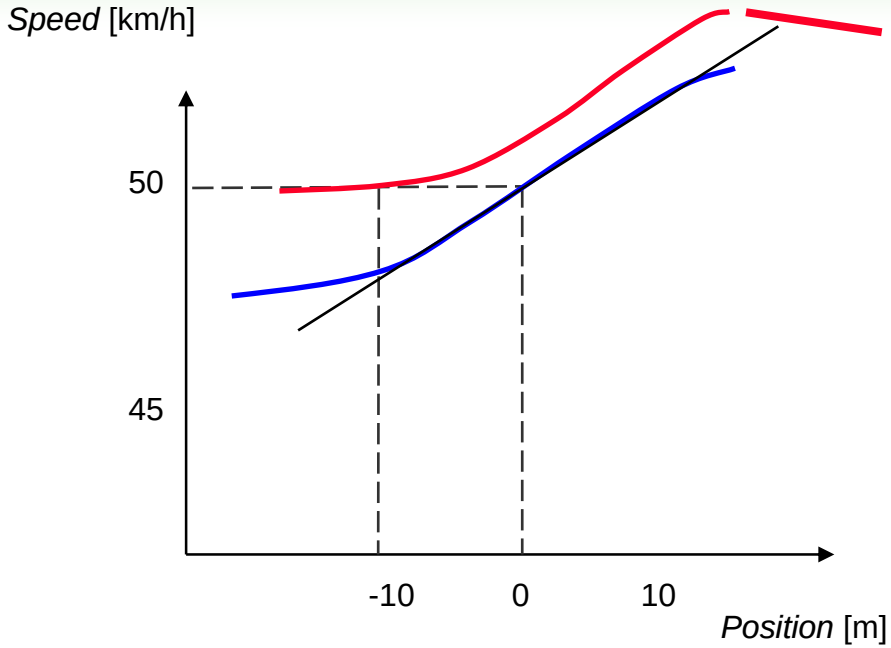
Repeat runs at constant 50km/h in gear(s) used for the acceleration test

Calculate the noise level for urban driving

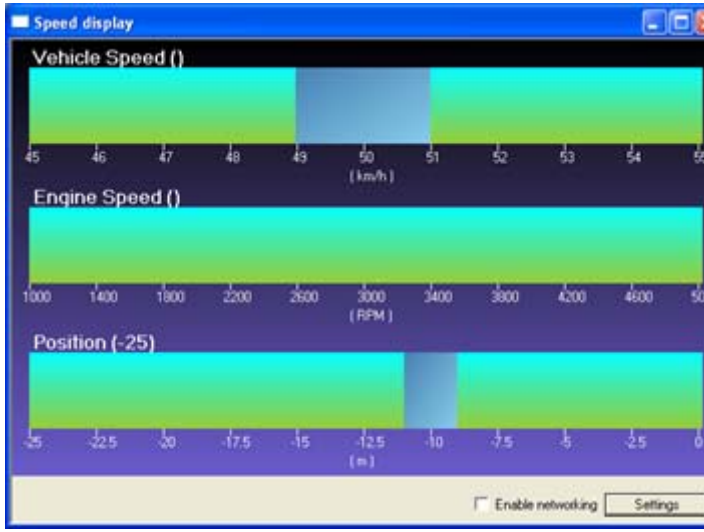
Graphically



M1, M2 < 3.5to and N1



The Drivers Aid display can be set to display the necessary entry speed to fulfill the standard



Find a target entry speed that has you driving at 50km/h by the time you cross the 00' axis - Entry speed changes according to gear used and vehicle **P**ower to **M**ass **R**atio (PMR)

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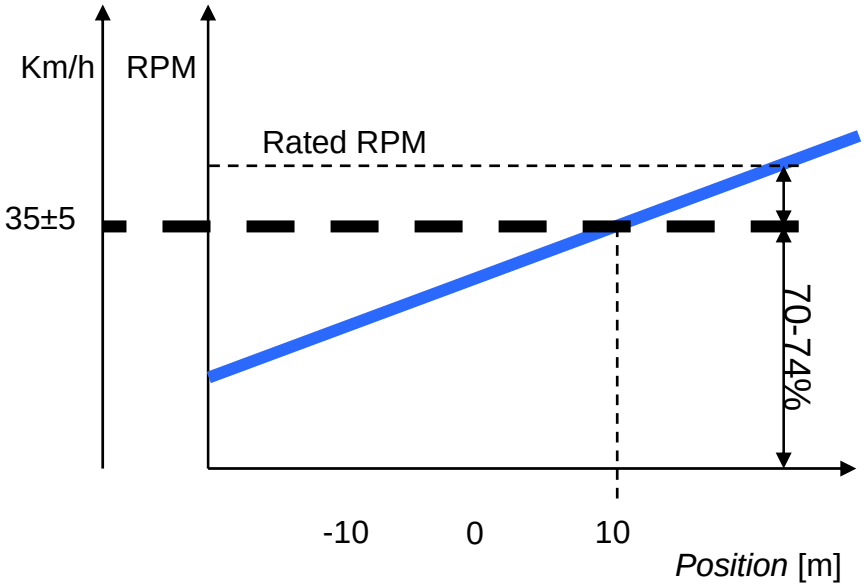
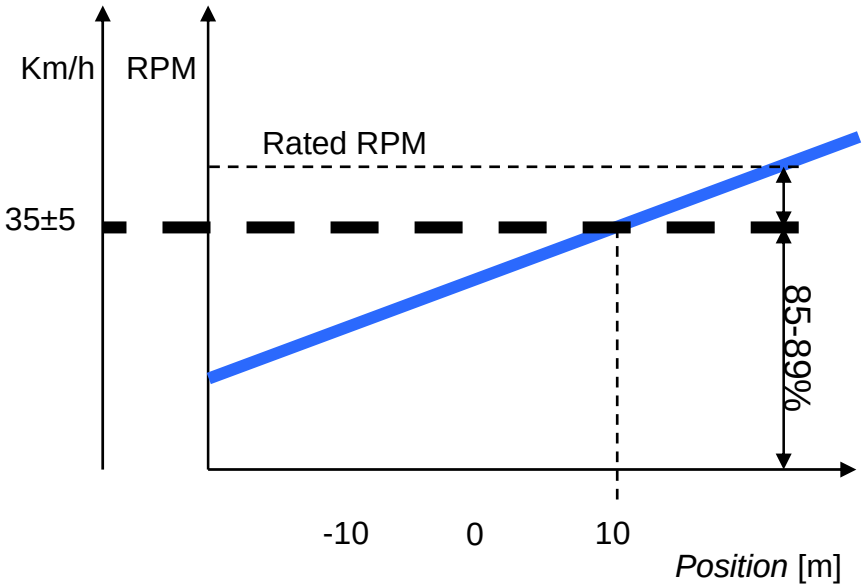
M2>3.5to and N2

When the reference point passes line BB', the engine revolution nBB’ shall be between 70 per cent and 74 per cent of speed S, at which the engine develops its rated maximum power, and the vehicle speed shall be 35 km/h ± 5 km/h.



M3 and N3

When the reference point passes line BB', the engine revolution nBB' shall be between 85 per cent and 89 per cent of speed S, at which the engine develops its rated maximum power, and the vehicle speed shall be 35 km/h ± 5 km/h.



Remember...

Stable acceleration condition shall be ensured. The gear choice is determined by the target conditions. If the difference in speed exceeds the given tolerance, then two gears should be tested, one above and one below the target speed.

Required Measurement Accuracy

- The rotational speed of the engine shall be measured with instrumentation having an accuracy of **± 2 per cent** or better

- The road speed of the vehicle shall be measured with instrumentation having an accuracy of at least **± 0.5 km/h** when using continuous measurement devices.

- Meteorological Instrumentation Accuracy:
  - *temperature measuring device, ± 1 °C*
  - *wind speed-measuring device, ± 1.0 m/s*
  - *barometric pressure measuring device, ± 5 kPa*
  - *relative humidity measuring device, ± 5 per cent.*

Test Mass

M1 $_{mt}$ = m_{kerb} + 75 kg for the driver

N1 $_{mt}$ = m_{kerb} + 75 kg for the driver

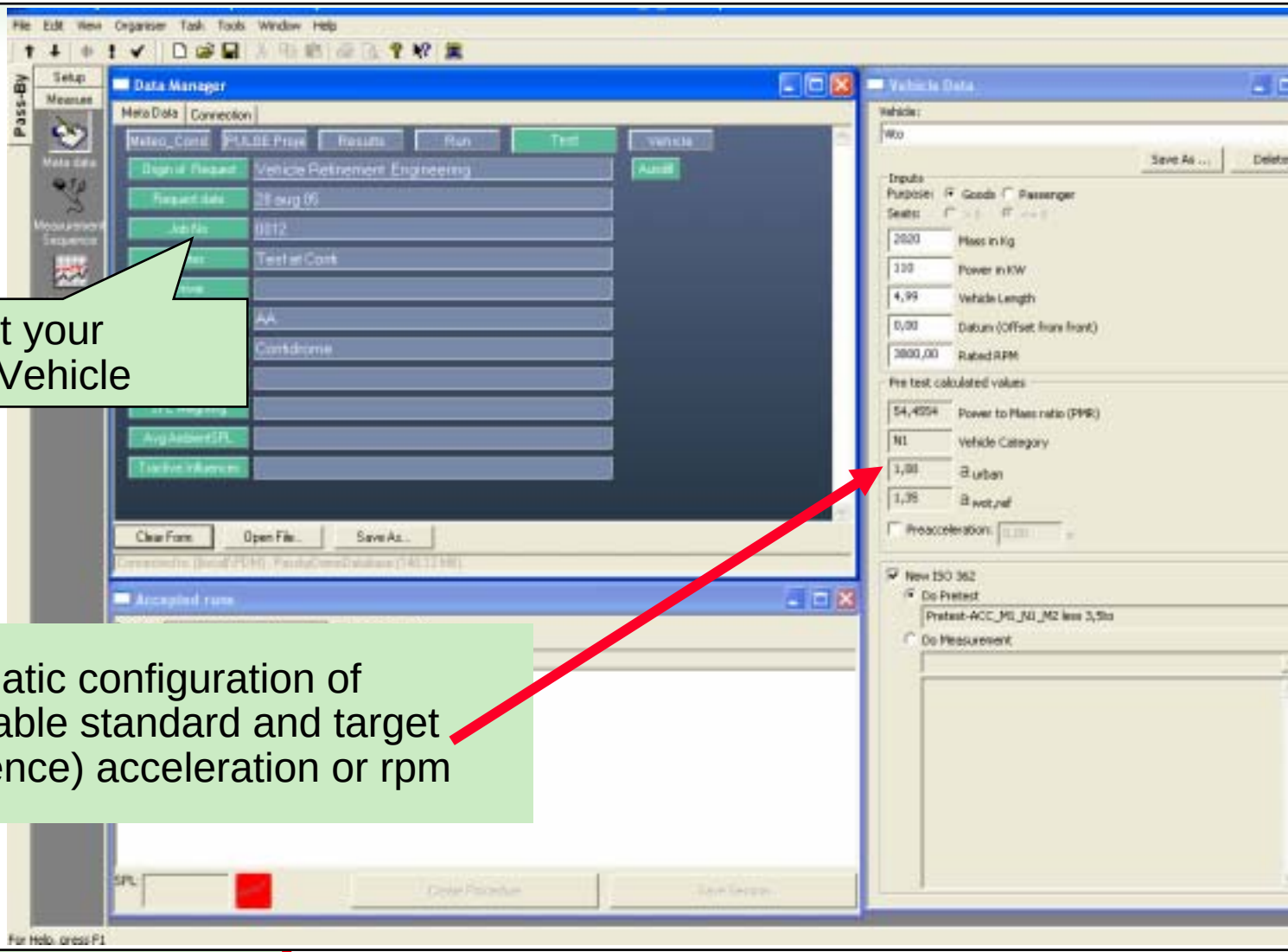
N2, N3

mt = 50 kg per kW rated power

Extra loading to reach the test mass of the vehicle shall be placed above the driven rear axle(s). The extra loading is limited to 75 per cent of the maximum mass allowed for the rear axle. The test mass must be achieved with a tolerance of ± 5 per cent.

M2, M3 $_{mt}$ = m_{kerb} + 75 kg for the driver

We offer



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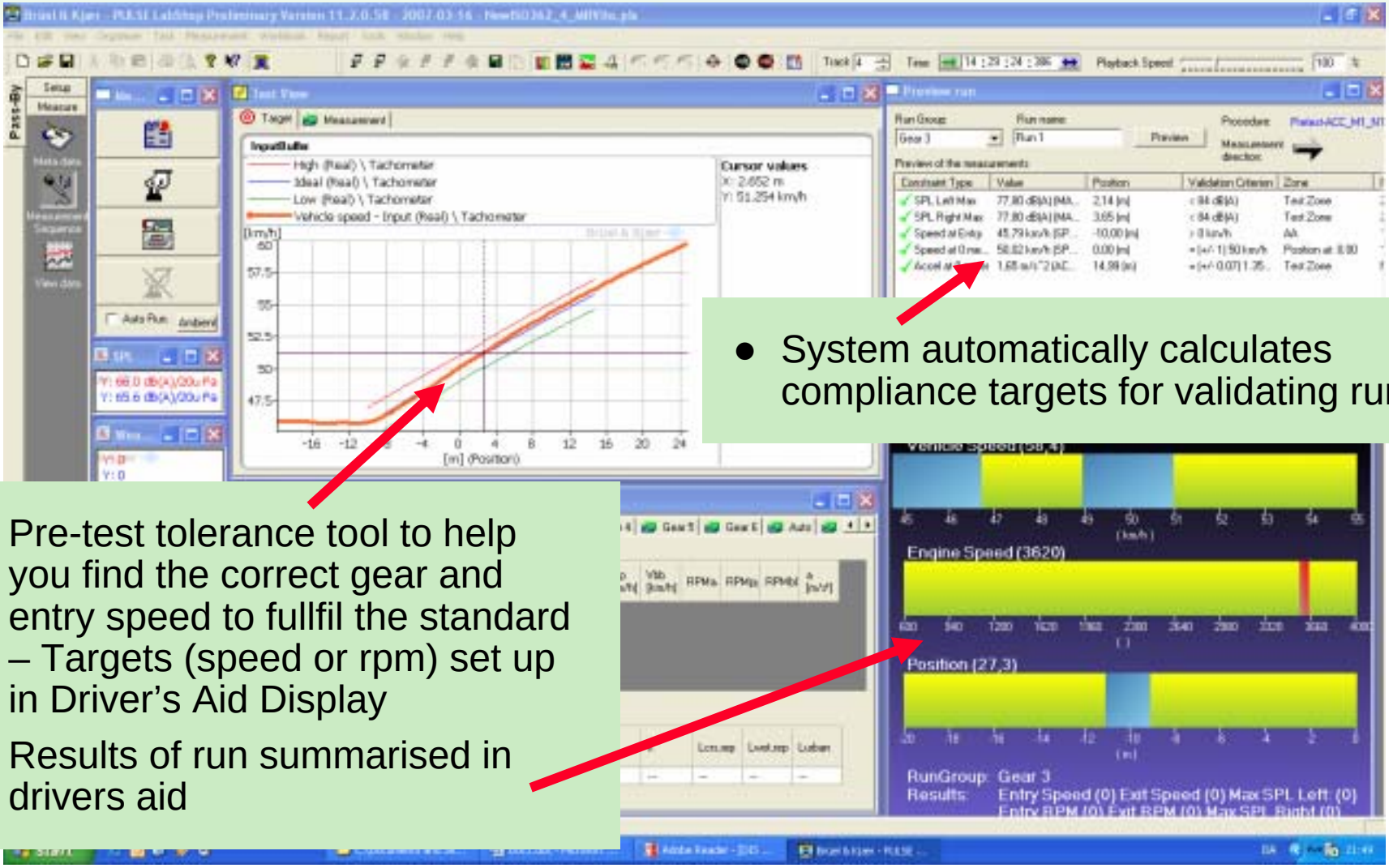
We offer M1, N1 & M2<3.5to



- System automatically calculates compliance targets for validating ru

- Pre-test tolerance tool to help you find the correct gear and entry speed to fullfil the standard – Targets (speed or rpm) set up in Driver's Aid Display
- Results of run summarised in drivers aid

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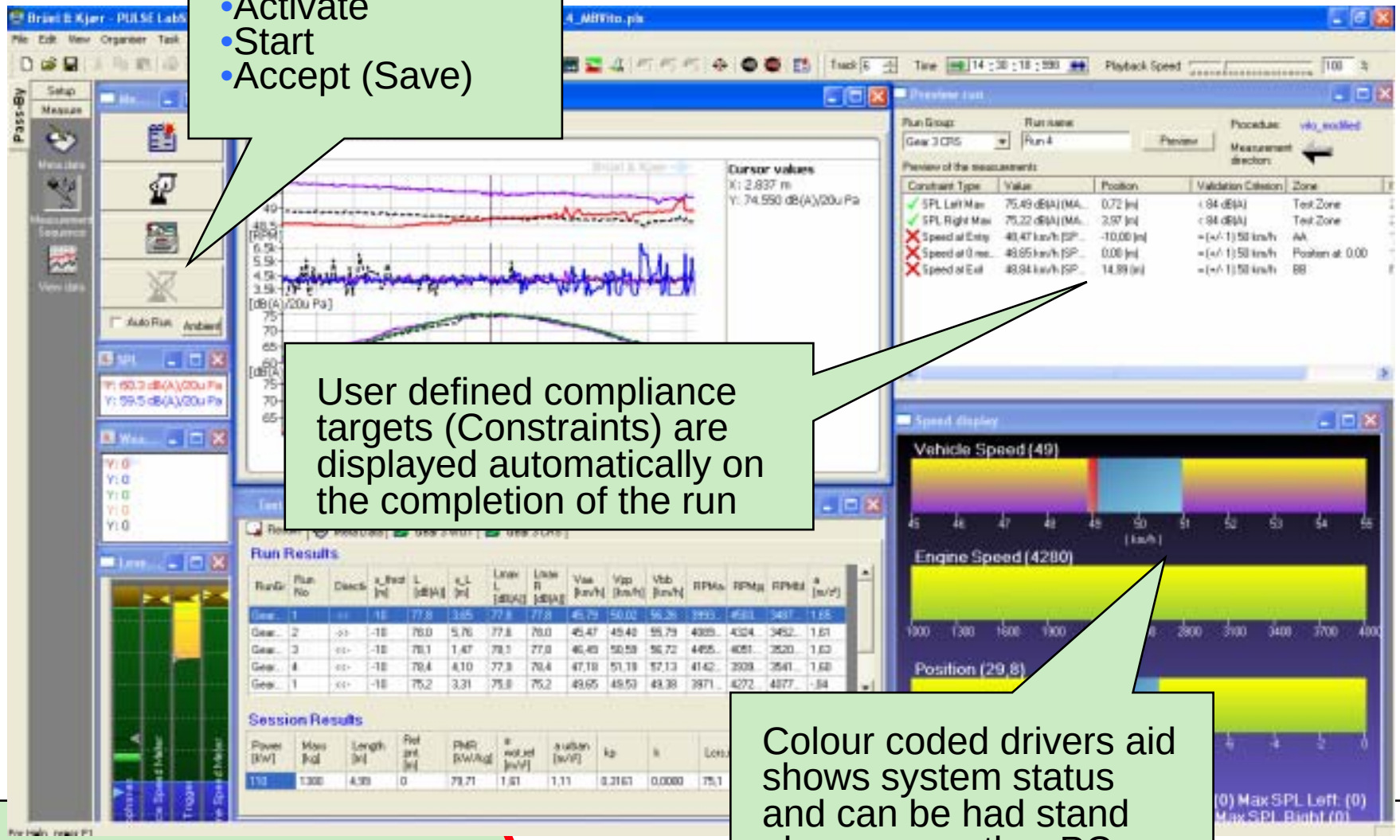
Run the measurement

3 button operation
- Activate
- Start
- Accept (Save)

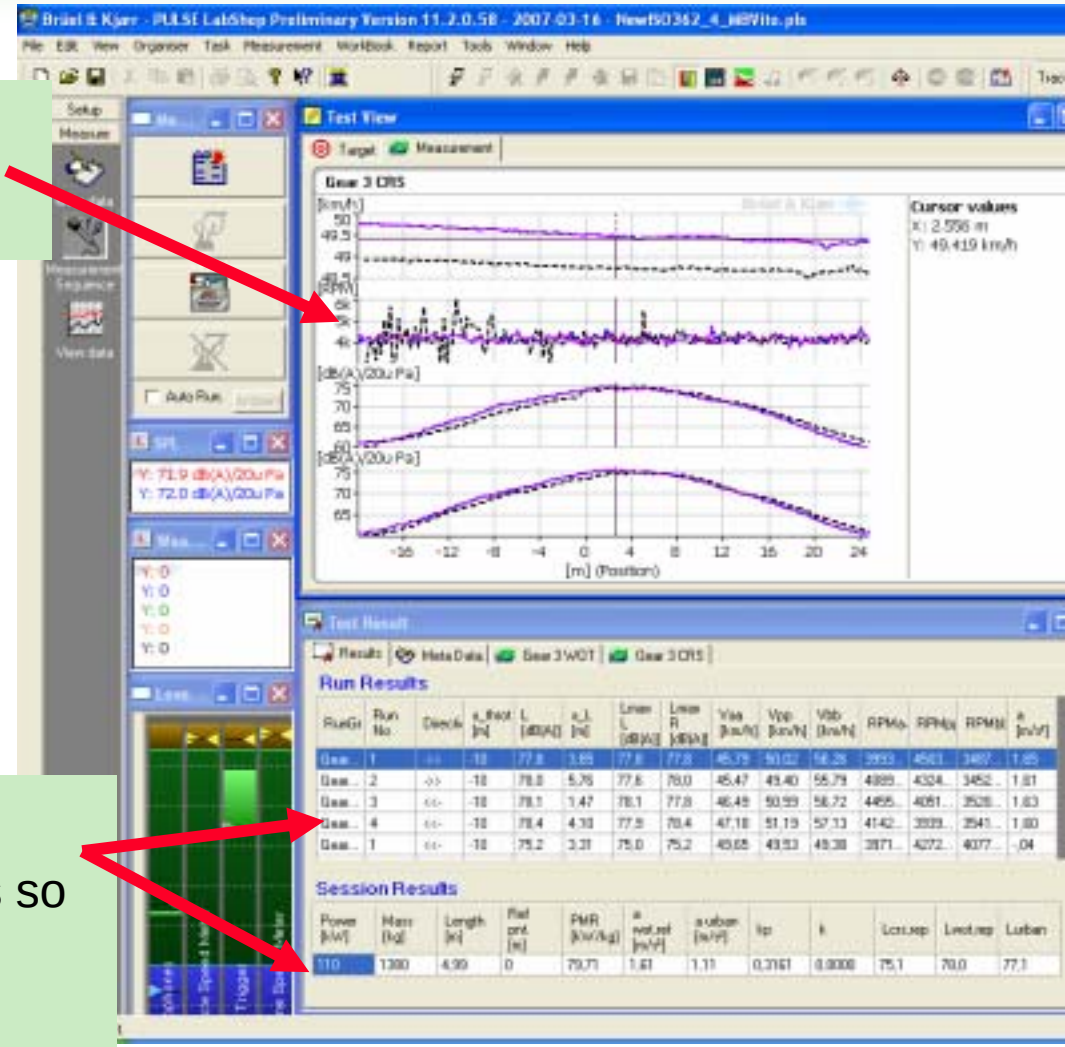


User defined compliance targets (Constraints) are displayed automatically on the completion of the run

Colour coded drivers aid shows system status and can be had stand alone on another PC

We offer

Runs shown overlaid directly during the measurement



Automated Calculation of results tabular overview of run results so you can see how your test is progressing

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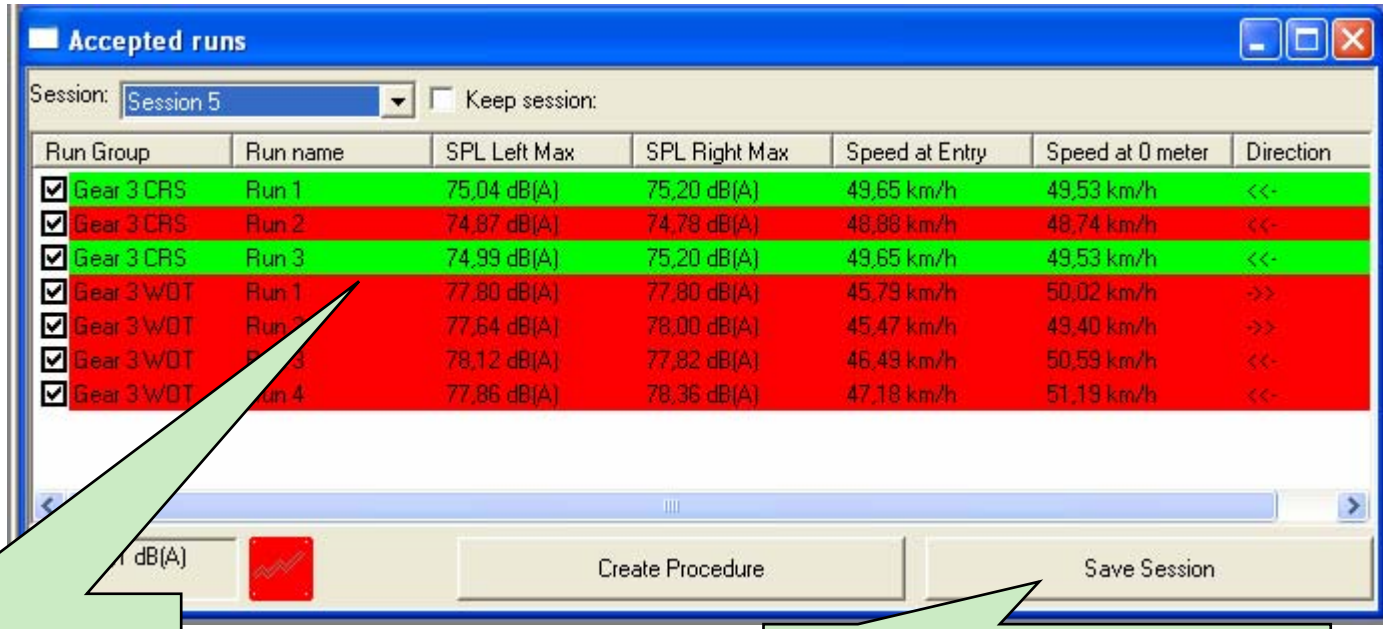
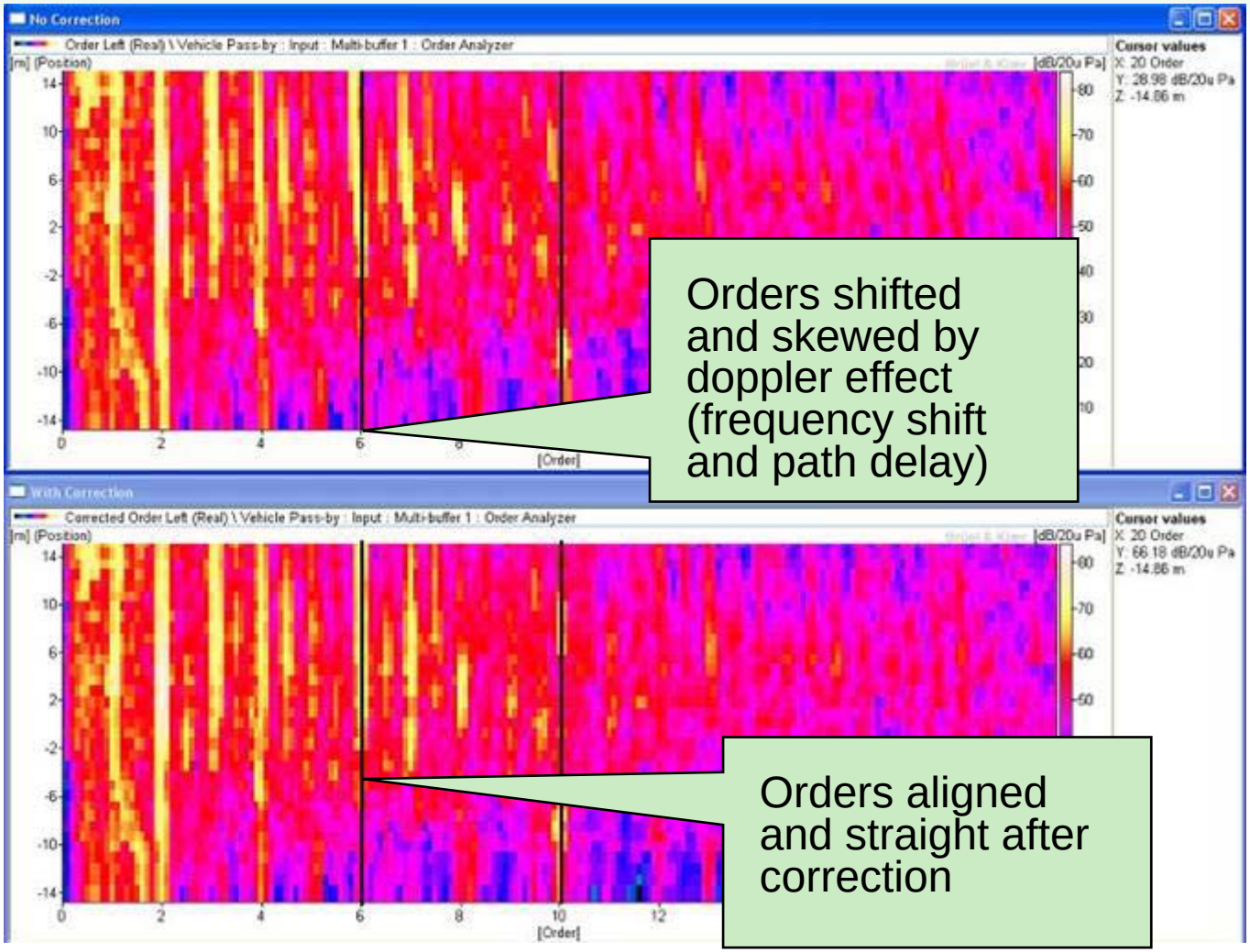
Validate Quality of data



Saved runs are displayed with in the “Accepted Runs” window colour coded to show compliant and non compliant runs

All selected runs safely stored to database

Features - Doppler Compensation



Measurement of a truck at 30 km/h

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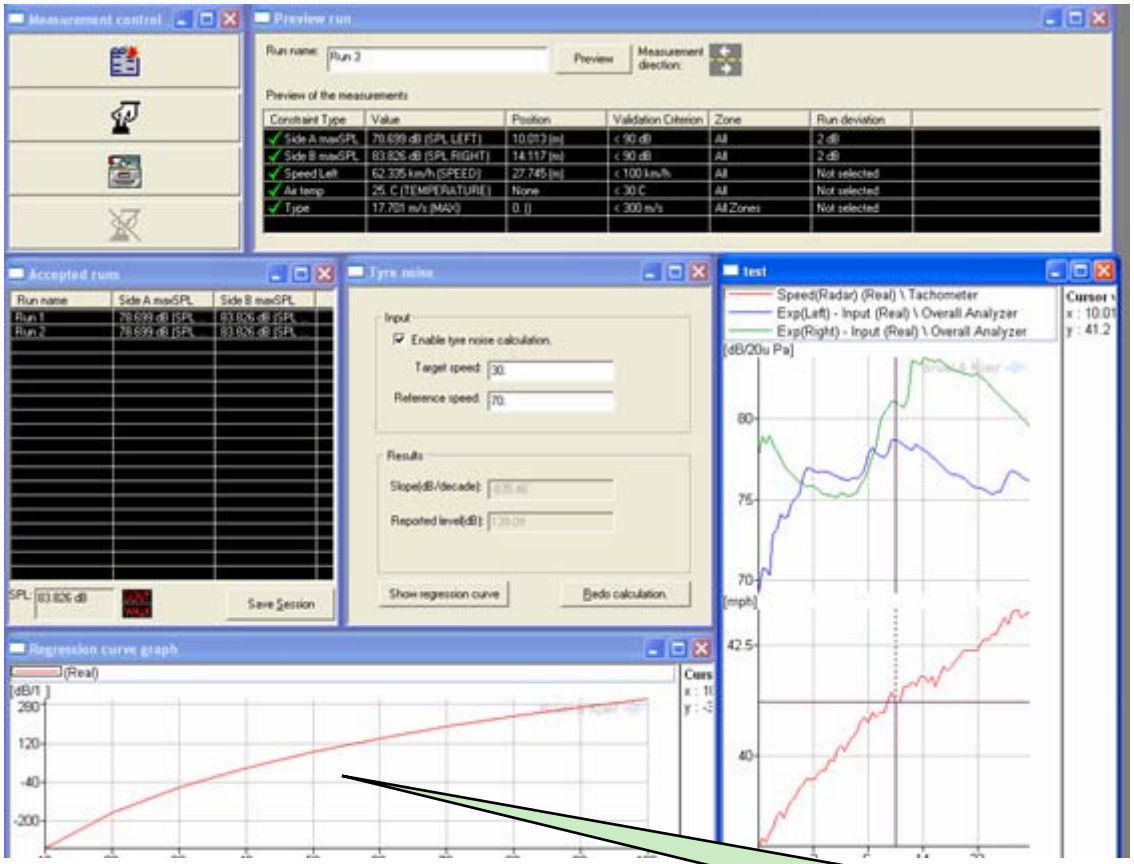
Support Of Tyre Noise Measurements



Easy generation of a regression curve

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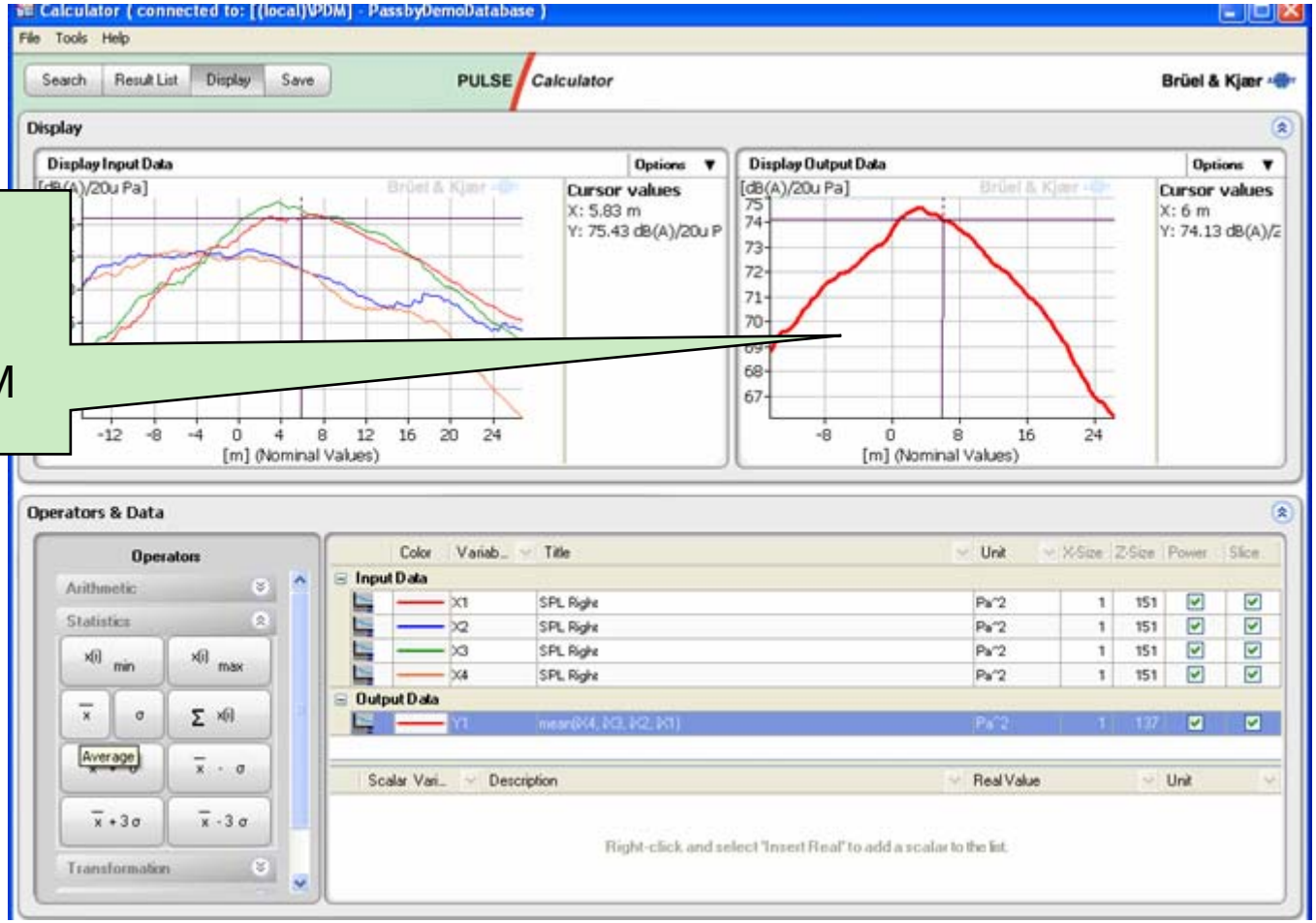
Once in the database - Post Processing Results

Arithmetic and statistical calculations on results via the PDM calculator



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Hardware Package

- *Type 3643-A/X, In-vehicle box for housing PC and frontend, with built-in tacho option*

- *Type 3645-A/X, Pass-by Ground station solution compact package with intelligent connection box*

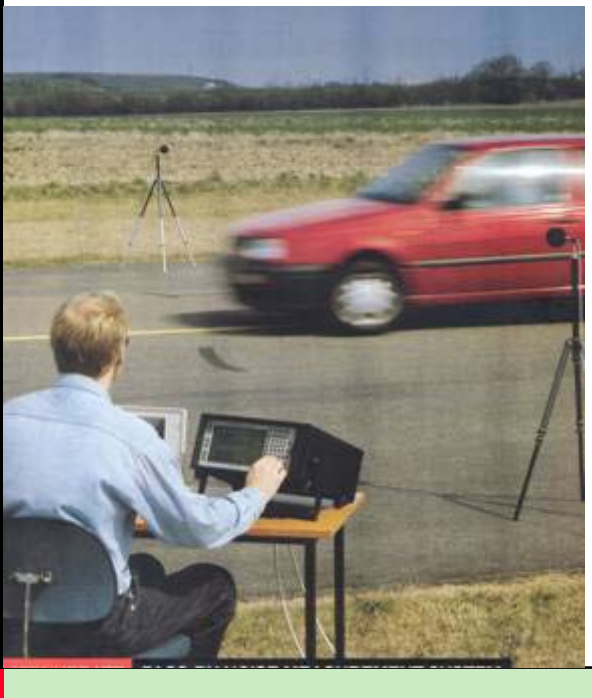
- *Type 3646-A/X, In-vehicle unit for in-vehicle channels*

Speed Measurement

- Use radar
  - Can be used with common radar types that provide TTL output
    - *Note: Built-in real-time radar drop out repair*
- Use MicroMet
  - Mount in-vehicle or with groundstation
- Optical devices
  - Mount in-vehicle
    - *Corsys Datron devices provide extremely accurate speed measurement on calibrated surfaces*
- Precision GPS
  - Mount in-vehicle and use for speed measurement
    - *Note: Not advisable to use GPS for position as well due to poor positional accuracy even with DGPS (±0.4m using real-time radio broadcast correction)*

Securing your investment

- Remember your old friend 3558?
- Trade in some of your old hardware and reuse the rest with your new system



- Reuse of:
- Microphones and cables
- Radar and cables
- Photocells and cables

After all, if they're still working why throw them away?

End of Presentation