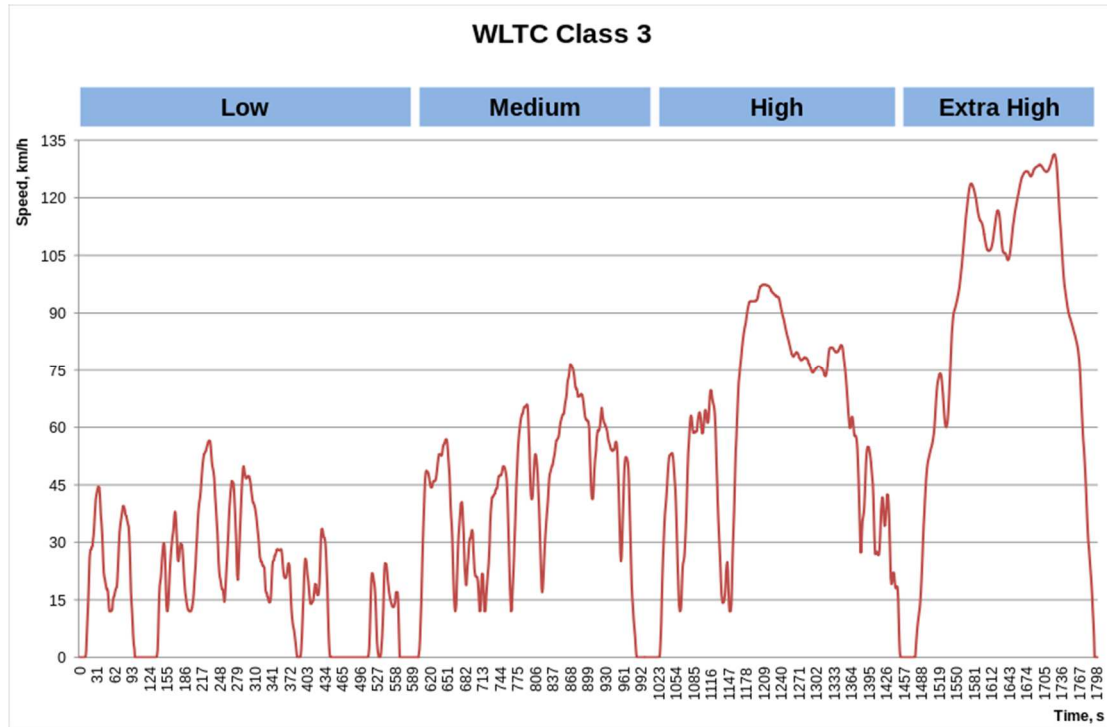


Euro IV transient NOx on WLTP cycle

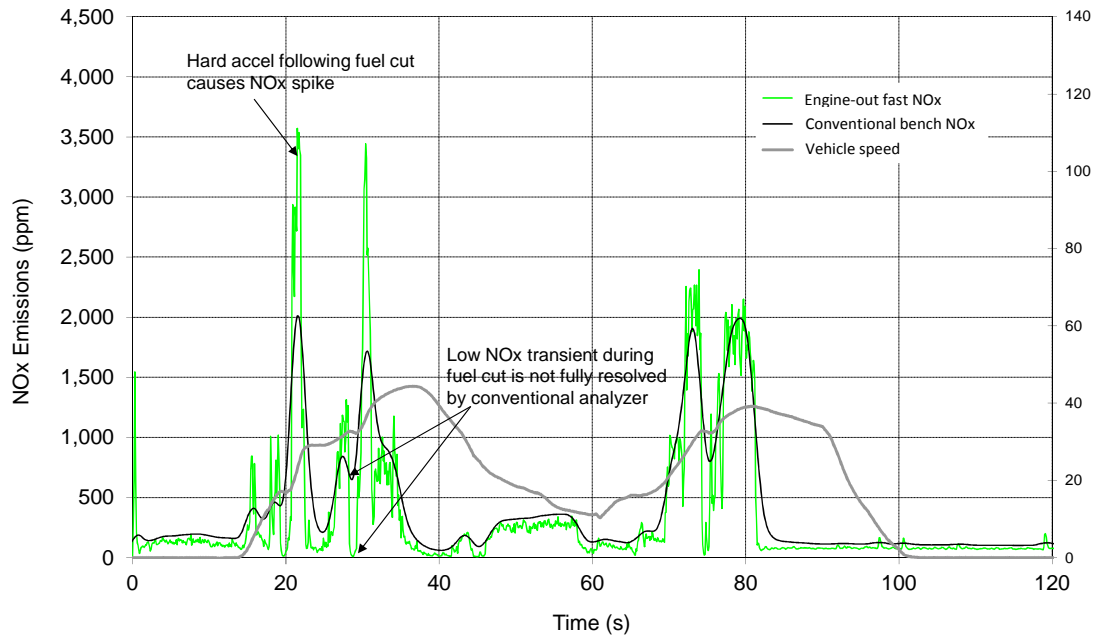
The Worldwide Light duty harmonised Test Procedures are expected to be finalised by end of 2015 and are intended to be a global standard for determining emissions, fuel consumption and other features of vehicles.



The WLTC cycle which applies to any vehicle is based on its power-to-weight ratio and also its maximum attainable speed, but in general, the cycles are more transient in nature than the existing NEDC European Drive Cycle.

The transients are intended to be more representative of “real world” driving and present new challenges for engine calibrators along with opportunities for fast response emissions analyzers accurately to record the transient emissions.

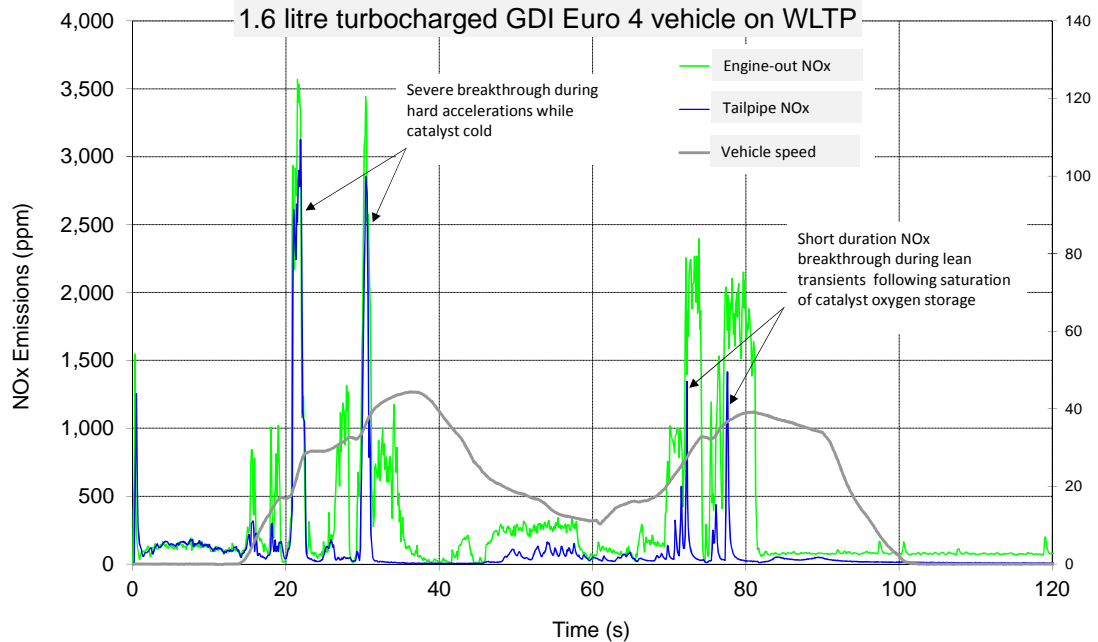
A Peugeot 308 with the BMW “Prince” 1.6 litre turbocharged GDI engine (calibrated for Euro IV) was driven on the above WLTP cycle and the engine-out NOx emissions were recorded with both conventional and fast CLD analyzers.



The above plot shows the difference in temporal resolution of the NOx data which is evident over the first 2 minutes of the cycle.

Although both analyzers are sampling the same gas and generally agree during less transient portions of the cycle, when rapid transients occur, the fast response NOx emissions clearly indicate the dynamic nature of the engine's emissions.

The calibrator (equipped with an open ECU and other sensors) can then take note of any correlation with external/internal EGR, AFR and injection timing, valve timing etc.



Measurements after the three-way catalyst show up the transient NOx trapping efficiency of the aftertreatment system allowing assessment of oxygen storage state, AFR control and temperature effects.