

Error message! How mobile phones distort measurements

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Nowadays we don't only take measurements with simple measuring devices, but also with whole measuring systems. These are very complex and are completely set up from their component parts at the point of use. Vehicle scales are an example of such a system. They weigh vehicles like trains, lorries or cars.

Unfortunately these complete systems are susceptible to electromagnetic radiation such as that transmitted by mobile phones and radio transceivers – and this is despite the fact that the individual components of the system have passed the standardized test for exactly these types of radiation.

This type of test is called an Electromagnetic Compatibility Test and should now also allow the Verification Authorities to test complete systems on site. For this purpose the PTB (Physikalisch-Technische Bundesanstalt, Germany) has developed a facility for use on site, to test electromagnetic compatibility.

The legal requirements for measuring devices subject to legal control also include the EMC, which is tested within the scope of the type examination by PTB. Hereby, the single components of the measuring system are exposed to defined electromagnetic fields in the laboratory. Although the components have passed an EMC test conforming to standards, the measuring systems installed on site are occasionally disturbed by radio receivers or mobile telephones such that false measurement values are shown. For this reason, the responsible

authorities have in several cases rejected the verification of vehicle scales.

The awareness that the interference resistance of measuring systems is very decisively dependent on the configuration and the installation on site has not been sufficiently taken into account in the normative requirements. This discrepancy is based on the fact that the European testing requirements worked out several years ago do not sufficiently take into account the actual present-day disturbance source situation due to the spread of radio receivers and mobile telephones.

Due to this technical requirement and also the possible political consequences, a revision of the respective standards was initiated in which the PTB is participating. For the determination of new normative limiting values and for the assessment of the interference resistance of measuring devices on site by the verification authorities, metrologically traceable EMC tests on site are necessary, for which there has not been a measuring device available up to now.

For this reason, a transportable testing device was developed at the PTB, which enables testing at discrete frequencies between 27 MHz and 5.8 GHz. The frequencies were selected such that, on the one hand, the real disturbance sources are displayed and, on the other hand, the disturbance of radio services is avoided, so that as a result, the Federal Network Agency could grant a special permit for the restricted test operation. The frequencies of the testing device lie in the vicinity of the frequency bands of classical means of communication such as company radio and amateur radio, but also in the vicinity of the frequency ranges of modern communications systems such as GSM, DECT, UMTS, Bluetooth and WLAN.

In the test operation on site, the critical parts of the measuring system can at a distance of 1 m from the transmitting antenna be charged with

the electromagnetic field successively for 1 min in each case for each single frequency and thereby the correct function of the measuring system be assessed. By means of a suitable design and a software user guidance, the presence of an expert in high frequency engineering is not necessary for the operation of the testing device on site.

Source: Physikalisch-Technische Bundesanstalt (PTB)

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