EXTENSION OF ELECTROMAGNETIC COMPATIBILITY LABORATORY WITH A VIEW TO PROVIDING THE CONDITIONS FOR TESTING THE AUTOMOTIVE ELECTRIC AND ELECTRONIC SUB-ASSEMBLIES IN ACCORDANCE WITH THE PROVISIONS OF EUROPEAN DIRECTIVE 2004/104/EC

STAGE 03

Drawing up of the documents for extending the accreditation of EMC laboratory with the tests provided by European Directive 2004/104/EC

The third stage of the project was developed from 01.09.2007 until 30.11.2007, providing the following activities:

- Drawing up the documents necessary for accreditation
- Internal audit and corrective actions
- Submitting the documentation for extending the accreditation

1. During the first activity - *Drawing up the documents necessary for accreditation,* the technical procedures for the tests going to be accredited in the next stage were drawn up. These procedures refer to the following tests:

- Transient disturbance immunity test
- Electromagnetic disturbance immunity test
- Measurement of radiated emissions produced by electric and electronic subassemblies
- Measurement of transient voltage emissions produced by electric and electronic subassemblies

2. Within the second activity, an internal audit was planned, according to Decision no. 13049/02.10.2007. The internal audit was performed on the basis of the audit plan approved by the Scientific Manager, Prof. dr. Andrei Marinescu, during the period 15.10 – 10.11.2007.
3. Within the third activity of this project stage, all the documents required with a view to extending EMC laboratory accreditation were drawn up and submitted to RENAR.

The request for extending the accreditation, together with the other forms required by RENAR was drawn up, with a view to sending to RENAR the accreditation extension file.
According to the provisions of the second activity, an internal audit was organized, for making possible to assess the quality system activity and documents.
For the last activity foreseen within this stage, the documents were submitted to RENAR,

with a view to extending the laboratory accreditation with EMC tests on the Electric and Electronic Subassemblies.

At chapter **"7.TESTING PROCEDURE „** the way of performing each test was detailed, the methods for initial and final verification of the testing diagrams being specified; thus, the tests were carried out under complete safety as regards the good operation of the equipment from the laboratory.

For each test separately, the following could be mentioned:

1.1 Electromagnetic radiation immunity test

Regarding ESA immunity test to radiations, after analyzing the results and the way of performing the experiments, a development of the tests carried out within the previous stage followed; so, the current transformer test (BCI) was finalized. Because within EMC laboratory the endowment necessary for this test already exists, it was necessary only to perform some detailed experiments and to draw up the working procedures separately for each method for testing to electromagnetic field immunity.

For testing in the semi-anechoic room, an extension of the test range to more than 2 GHz could be propose in the future, because the laboratory already has the equipment necessary for this.

At the same time, the restriction of the frequency range in the lower side was necessary for testing in the semi-anechoic room from 80 to 200 MHz, because the level 30 V/m could be provided only for frequencies above 150 MHz (see the room calibration diagram, Figure 23).

1.2 Transient disturbance immunity test

Regarding the conducted disturbance immunity rest, which was developed and achieved within the project, after the first experiments performed it can be drawn the conclusion that now the laboratory has the whole endowment necessary for performing under good conditions this test, i.e. in accordance with provisions of Directive 2004/104/EC and ISO 7637-2: 2002.

In comparison with the previous stage, the tests provided in ISO 7637-3: 2002 could be also developed, so that now the immunity tests on the supply lines and data lines can be also accredited.

These tests will cover the requirements of customers or certification bodies which exceed the minimal requirements of the European Directive.

1.3 Measurement of radiated emissions produced by electric and electronic subassemblies

Regarding the measurement of radiated emissions, after analyzing the results and the way of performing the experiments, it followed that the achieved measurement set-up complied with the requirements from Directive 2004/104/EC and CISPR 25; this is confirmed by the noise level measurements, too.

With a view to accrediting, it was necessary to use only calibrated measuring cables, whose insertion loss is known and attested by a calibration report. The attenuation of the measuring cable providing the connection between antenna and measurement should be taken into account in assessing the final result. It is also necessary to perform the calibration of the measuring antenna for 1m distance.

The measurement of radiated emissions was experimentally achieved in the frequency range 0.15 - 30 MHz, in accordance with provisions from CISPR 25 (sub-

clause 6.4) by using the antenna VAMP 9423, existent in the laboratory; in the future, this test could be performed, if requested, although it is not provided in automotive directive.

- **1.4 Measurement of transient emissions produced by electric and electronic subassemblies**

For assuring an as good as possible accuracy in measurement, the test set-up could be mounted in a shielded room, with dimensions (5725 x 2350 x 2625) mm, already existent within EMC laboratory of ICMET Craiova.

If the customers will require it, the testing range could be extended by the method for measuring the conducted emissions presented in CISPR 25, which makes a disturbance assessment in the frequency range. For this, the laboratory has all the equipment and has an accreditation, to which certain new reference documents will be necessary, i.e. CISPR 25 and Directive 2004/104/EC.