

**(R) Electromagnetic Compatibility Measurement Procedure for Vehicle Components—  
Part 21: Immunity to Electromagnetic Fields, 30 MHz to 18 GHz, Absorber-Lined Chamber**

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### **1. Scope**

This part of SAE J1113 specifies test methods and procedures for testing electromagnetic immunity (of vehicle radiation sources) of electronic components for passenger cars and commercial vehicles. To perform this test method, the electronic module along with the wiring harness (prototype or standard test harness) and peripheral devices will be subjected to the electromagnetic disturbance generated inside an absorber-lined chamber. The electromagnetic disturbances considered in this part of SAE J1113 are limited to continuous narrowband electromagnetic fields.

Immunity measurements of complete vehicles are generally only performed at the vehicle manufacturer. The reasons, for example, are high costs of a large absorber-lined chamber, preserving the secrecy of prototypes, or the large number of different vehicle models. Therefore, for research, development and quality control, a laboratory measuring method shall be applied by the manufacturers.

Part 1 of SAE J1113 specifies the general, definitions, practical use, and basic principles of the test procedure

#### **1.1 Rationale**

The JAN 1988 version of this standard has been revised to incorporate the latest changes in the International Standards ISO 11452-2. A new section has also been added to incorporate the test procedures for performing the test on a non-metallic bench top (including a new requirement for field uniformity).

### **2. References**

#### **2.1 Applicable Publications**

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

### 2.1.1 SAE PUBLICATIONS

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1113-1—Electromagnetic Compatibility Measurement Procedures and Limits for Components of Vehicles, Boats (up to 15 m), and Machines (Except Aircraft) (50 Hz to 18 GHz)  
SAE J1812—Function Performance Status Classification for EMC Immunity Testing

### 2.1.2 ISO PUBLICATIONS

Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

ISO 11452-1:3<sup>rd</sup> Edition 2/2005—Road vehicles—Component test methods for electrical disturbances from narrowband radiated electromagnetic energy—Part 1: General and definitions  
ISO 11452-2:2<sup>nd</sup> Edition 10/2004—Road vehicles—Electrical disturbances by narrowband radiated electromagnetic energy—Component test methods—Part 2: Absorber-lined chamber

## 3. *Measurement Philosophy*

The objective of an absorber-lined chamber is to create an indoor electromagnetic compatibility testing facility. The shielded chamber is lined with absorbing material on as many surfaces in the chamber as possible to minimize reflections and resonance. The design objective is to reduce the reflectivity in the test area to -10 dB or less.

Typical application for this test method is recommended for frequency range of 30 MHz to 18 GHz.

## 4. *Test Conditions*

Standard test conditions are given in SAE J1113-1 for the following:

- test temperature;
- supply voltage;
- modulation;
- dwell time;
- frequency step sizes;
- definition of test severity levels;
- test signal quality;
- test severity level.

## 5. *Test Location*

The tests shall be performed in an absorber-lined shielded enclosure. The objective of an absorber-lined shielded enclosure is to create an isolated electromagnetic compatibility test facility. Basically, an absorber-lined shielded enclosure consists of a shielded room with absorbing material on its internal reflective surfaces, optionally excluding the floor. The design objective is to attenuate the reflected energy in the test area by at least 10 dB compared to the direct energy.