

Personal Safety in High Frequency Electromagnetic Fields

Protective Clothing: Standards and Measurement Procedures

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Biographical Note

Michael Koch received the Dipl.-Ing. and Dr.-Ing. Degree (Ph.D.) from the University of Hanover in 1993 and 1998 respectively. His research interests included analytical and numerical computation of electromagnetic fields and electromagnetic compatibility. He was responsible for several projects concerning immunity and emission measurements of electronic equipment in TEM waveguides.

In 1998 he joined AUTOFLUG GmbH in Rellingen, Germany, where he was working as EMC Manager. He was responsible for the development and production of electrically conductive textile materials and the products made of them. He was involved in several research projects concerning the radiation of high power microwaves and the interaction with electronic equipment.

In 2002 he joined the “Institute of the Basics of Electrical Engineering and Measurement Science” at the University of Hanover, Germany where he is currently working as a professor for electromagnetic compatibility.

He is author of more than 35 papers on EMC theory and applications. Dr. Koch is Member of IEEE and VDE of Germany

Proposed Topic :
Standards and Specifications

Abstract

Protective clothing for personnel exposed to high frequency electromagnetic fields has been available on the market for more than 30 years but has not been used very much in practice. The personnel was not feeling the need to wear these suits. Standards or even measurement procedures were not available and for this reason it was nearly impossible to quantify the performance of a protective suit. This situation has changed significantly.

- In consequence of the large number of publications on biological effects of electromagnetic fields the public focused on this topic.
- In Germany this led to the accident prevention regulation BGV B11 issued by the Employers' Liability Insurance Association in June 2001. It is based on the limits for field strength given in DIN-VDE 0848 and contains regulations for personnel exposed to electromagnetic fields. It is now mandatory for the employer to protect his employees from potentially harmful electromagnetic fields.
- In March 2002 the final version of the standard DIN 32780-100 "RF Protective Clothing" was issued by DIN (German Standardisation Institute). The standard defines measurement procedures for RF Protective Clothing. Activities are in progress to extend DIN 32780-100 to a European Standard (EN).
- The increasing public attention concerning electromagnetic radiation combined with the more restrictive standards led to the development of new textile materials suitable for RF protection. New suits enable personnel to work in the vicinity of antennas without disrupting the operation due to safety reasons. This becomes more and more important because an aerial mast today hosts services from several providers. Shutting down antennas may be impossible for commercial reasons.

In this contribution a short introduction to personal safety in electromagnetic fields is given. The present standards are reviewed with special emphasis on BGV B11 and DIN 32780-100. Measurement procedures are discussed and results are shown for different RF Protective suits. In addition questions concerning ergonomic aspects and safety requirements are addressed. Especially safety requirements such as the use of flame retardant fabrics are of great importance. Some experiences from the use of RF Protective suits within the framework of the RF Safety Concept of German TELEKOM are discussed.



Figure 1: Measurement Setup According to DIN 32780-100