P-44 AVERAGING METHODS FOR RELIABLE MEASUREMENTS

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Objectives. Assessment and evaluation of exposure in radio frequency (RF) fields requires averaging procedures of electric field strengths, e.g. the ICNIRP guidelines of 1998 include the requirement that the electric field strengths have to be averaged over a volume corresponding to the body of a human being. It is stated in such documents that the measured electric field strengths have to be averaged over a volume corresponding to the human body. Some of these documents give rather general recommendations, others define very precise an averaging procedure. Anyway, there is almost no scientific rationale available to justify specific averaging procedures. Therefore there is high need to earn knowledge on specific field distributions in the environment of fixed installed RF transmitters, e.g. base stations and to identify reliable averaging procedures for limited numbers of assessed field levels. Based on the field distributions assessed in [1], the reliability of different averaging procedures was examined. In the frame of the EUREKA project BASEXPO specific averaging procedures were developed for mobile communication frequency bands. First results of this work are presented within this abstract.

Methods. Based on the results and evaluated data presented in [1] different averaging schemes were applied to volumes corresponding to the dimensions of the human body exposed to RF fields. A large amount of simulations performed in this project with a simulation tool solving the Maxwell's equations delivered a considerable data base taking into account multipaths propagation. To make the data comparable with data obtained in the frame of measurement campaigns [2], the chosen templates were built by averaging the 3mm voxels over the volume of a measurement antenna (i.e. a biconical antenna [3] with an integrating volume of a sphere with approximately 13.6cm diameter). To simplify evaluations the sphere was replaced by a cube with the same volume (edge length of 11cm). Deviations of -0.22 to 0.42dB were found by comparing the mean value of the field strength averaged over a sphere with the volume averaged over a cube. Averaging over such a cube delivered the mean field level for a single position of a template. In order to get different templates a certain amount of such positions (3 and 4) were extracted and arranged consecutive to each other with a distance of 15cm or 30cm as well as four positions arranged in a square with a distance of 15cm to each other from center to center (see Figure 1). These templates were than moved through the whole examined volume and the mean value of the 3 or 4 positions was calculated to obtain averaged field values. The grid step for moving the built templates through a volume was for all cases 15cm in each orthogonal direction. Analyses of the evaluated data will be performed to find suitable averaging schemes for assessing the mean field strength value averaged over the whole body.

Results. Preliminary results are available for 946 MHz. For the Line 3 Template the mean values of the electromagnetic field strength are shown in Table 1. The variation of the mean value of the 4 templates moved through each volume gives preliminary results of the

variability of the local averaged field levels compared to the global electromagnetic field strength.

Conclusions. Only very limited and preliminary conclusions can be drawn at the present state of the evaluated data due to the lack of results. It can be said that the simpler shape of a cube instead of a sphere can be applied with only sparse uncertainties. At the moment it looks as if the derived mean values delivered by the templates are showing no big difference between the four tested templates, so more positions building a template or a more complex configuration (square instead of a line) might not lead to more precise results.

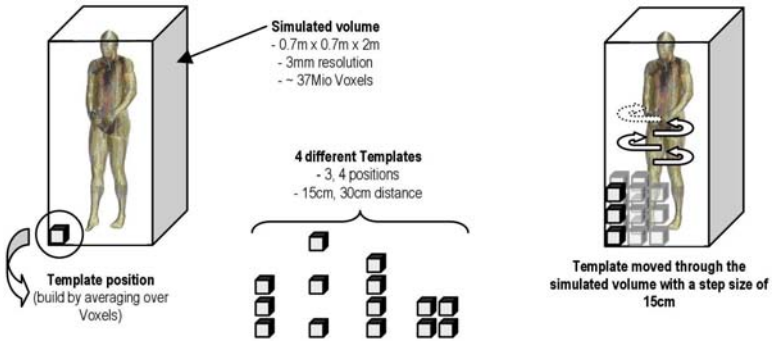

FIGURE 1. Averaged Voxels over a cube building the position of a template. Cube with an edge length of 11cm. Four different templates are shown consisting of a different number of positions (3, 4) and with a different distance of each consecutive position (15cm, 30cm). The right graphic should display a template consisting of 3 positions moved through the investigated volume. On each location the mean value of the e.g. 3 positions was build.

P-45 AN ON SITE SAR EVALUATION USING PLANE WAVE SPECTRUM REDUCTION

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Objectives. In this paper we present a study which aims at developing an evaluation method of the human exposure to electromagnetic fields in terms of specific absorption rate (SAR) in order to compare to the ICNIRP or IEEE limits. The objective of this study is the direct evaluation of the SAR through on site measurements of electric filed. Straight on

The Bioelectromagnetics Society
29th Annual Meeting
Abstract Collection

Kanazawa-shi Bunka Hall
Kanazawa, Japan
June 10 - 15, 2007