



ET Docket No. 03-137 - Comments on the Proposed Changes in the Commission's Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields

Comments on the use of Spatial Averaging for RF Exposure Compliance

We respectfully request that the Commission consider these comments:

We feel that with regard to spatial averaging several issues coming from its use in determining compliance have become apparent. The use of spatial averaging came about to address the non-uniform nature of RF fields common in many RF environments. Unfortunately its general and broad application across a wide spectrum of licensees has led to unintended consequences. Its use can lead to incorrect assessments of the exposure hazards, and as such its general application in compliance is questionable.

Assumed body size/geometry

Spatial averaging field measurements are based on an assumed body size (6ft) and on an assumed position (standing). Both of these assumptions are arbitrary in nature may not actually reflect reality for many workers engaged in activities at sites with RF exposure concerns. While such an assumption may be sufficient for transient workers, we feel this is inappropriate for those performing work in exposure areas. We agree that the area of measurement should cover reasonably all areas for which a persons body may be exposed, however we see no reason for the given assumption of size and geometry for purpose of averaging the resulting measurements in determining compliance.

Spatial Average vs. Partial Body

It was largely assumed by many that allowable partial body exposure levels would always be lower than the level defined for spatial averaging. Potential causes of partial body overexposure may include close proximity exposure, or highly directional antennas, such as aperture antennas, exposing only part of the body. Please note that field measurements and SAR measurements are quite different. In SAR measurements the irradiated phantom serves to raise the spatial average measurements beyond the partial exposure area, this is not the case in field measurements.

Measurements

In close proximity to antennas the field strength over the body can vary widely as depicted in figure 1. Partial body exposure may exceed allowed limits while the resulting spatial average is shown to be within acceptable levels. We believe it is inappropriate to use spatial averaging in close proximity to the antenna (the "near-field"), if at all. We believe spatial averaging, at least in its current form, is not appropriate in this region and that spatial peak, although conservative represents the best option for general safety and compliance. It should be noted that at the very least, among standards bodies, there is a question as to whether spatial averaging can be appropriately applied in the case of exposure to eyes and testes. Therefore, we believe that the conservative approach of

using spatial peak for measurements exclusively in the near-field is both prudent and appropriate.

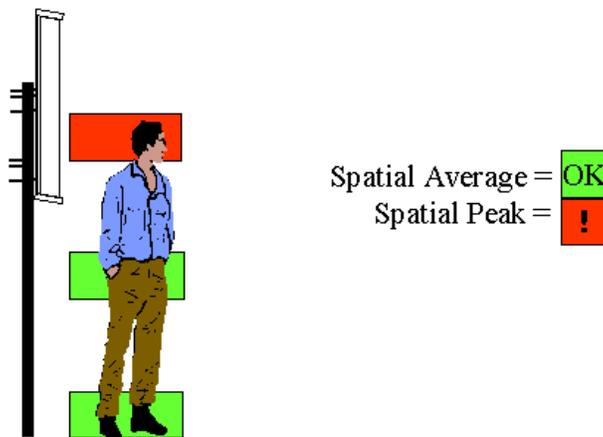


Figure 1. Close Proximity Exposure. In some situations Spatial Averaging may greatly underestimate the hazard potential.

Modeling

Many commercially available software-modeling packages also perform 'Spatial Averaging'. This however is often not a direct application of the equations found in the FCC guidelines¹, which are an approximation of spatial averaging. Often antenna patterns and/or tables/graphs such as that defined in the CTIA recommendations² are implemented to add additional loss, better approximating the effect of reduced exposure due to declination/orientation of the 'measurement point' in question from the antenna. Unfortunately modeling in this manner introduces the same failings found in measurements when the resulting points are 'Spatially Averaged'. This is essentially taking the average of an approximation of a spatial average, which we believe is generally not a good idea when it comes to safety. These software packages are made available to, and purchased & used by people who may not be familiar with how they work, when it may be appropriate or inappropriate to use such extensions. Such tools are engineering aids and should only be used by technically competent individuals who are accountable for their use, and in responsible charge of the results, or the results of individuals under their direct supervision.

Timothy J. Noyes

RFpeople, LLC

48 Brooke Crest Lane

Stafford, VA 22554

tnoyes@rfpeople.com

www.rfpeople.com

¹ OET Bulletin 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, Robert F. Cleveland Jr., David M. Sylvar, Jerry L. Ulcek, 1997

² CTIA's EME Design and Operation Considerations for Wireless Antenna Sites, R. Tell, 1996