MICROWAVE SHIELDS MADE OF NON-VOWEN FABRICS CONTAINING CARBON ADDITIVES AND GEOMETRIC SHAPES FORMED WITH ALUMINIUM FOIL

H.D.A. Abdulhadi, A.M. Prudnik

The materials on the basis of non-vowen yarn to ensure shielding properties in a wide range of frequencies are praiseful if they are outlined by a high level of protection from the effects of external microwave fields, biological compatibility with biological objects [1].

Today there is a strong need for the materials that can be used to make protective shields from the microwave radiation produced by various electronic appliances. The most actual problem is to produce soft, breathable and cheap materials to ensure a sufficient degree of suppression of microwave radiation [2].

The experimental pieces of the needle-punched non-vowen fabrics containing carbon additives were produced of polyester with linear mass density 0.33 tex and 0.44 tex, polypropylene with linear mass density 0.33 tex, and wool with linear mass density 76 tex. As carbon additives we used carbon cellulose-hydrate filaments. The carbon cellulose-hydrate filaments were 65 mm long, with diameter of the fiber of 7–10 μm, with linear electrical resistance less than 20 Ohm·cm and electrical resistance about 0.024 Ohm·cm [3]. To ensure better reflective properties we attached geometric shapes formed with aluminium foil to the surface of the non-vowen fabrics.

To study the shielding peculiarities, we used a scalar network analyzer to measure transmission and reflection coefficients. The transmission and reflection coefficients of the experimental pieces were studied in the range of 0.3 to 17 GHz using scalar network analyzer. The microwave radiation transmission coefficient provided by the experimental pieces varies in the range of –7.0 to –15 dB and the reflection peculiarities vary in the range of –3 to –15 dB.

The main superiority of non-vowen fabrics containing carbon additives is a possibility to add it as a protective layer for the protective enclosures and clothing.

References

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HISTOGRAM-BASED ALGORITHMS OF LOW-CONTRAST IMAGE ENHANCEMENT

M.A. Abdulwahid, Y. Alhashimi, I. Baryskievich

Enhancement of image quality is an important task for the security systems based on image processing. Currently, there are a large number of methods for processing the noisy grayscale images, both in the spatial and in the frequency domain. Spatial image enhancement techniques are a basis of simple and more complex image processing techniques [1].

Three algorithms for processing the noisy grayscale images in the spatial domain were developed. The first algorithm for enhancement of low-contrast images is based on calculation of the normalized and cumulative histograms of grayscale images and the formation of the output image with a uniform histogram in a given dynamic range. The second algorithm is based on selecting the histogram of the output image, calculating the cumulative histogram of the output image, calculating the normalized and cumulative histograms of the input image and comparing the values of the cumulative histograms of the input and output images, forming the output image with the specified histogram. An iterative contrast optimization algorithm is based on the procedure of grouping low-contrast image histogram components into a specific number of bins according