339
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Title:Reassessment of the electromagnetic reflection response of human skin at W-band
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Abstract:Is the helical-coil form of the eccrine sweat-gland in humans suggestive of latent electromagnetic antenna function? In short, do humans possess in these saline, fluid-supporting, coil-structures, an extrasensory/signaling apparatus? This is the hypothesis of Feldman et al. [Phys. Rev. Lett. 100, 128102 (2008); Phys. Med. Biol. 54, 3341 (2009)] as they sort to correlate the mental state of a person with his or her W-band emission response. Ney et al. [Opt. Lett. 35, 3180 (2010); J. Biomed. Opt. 16, 067006 (2011)] subsequently contested this and demonstrated theoretically that multiple interference arising from the layered morphology of skin is the principal mechanism governing sub-THz electromagnetic functionality of human skin. This paper repeats the experimental work of Feldman et al. A quasioptical reflectometer is employed and we observe extreme sensitivity from individual to individual in horn-antenna reflection measurements. Variability in dielectric properties and the layered morphology of human skin is confirmed to be the source of such sensitivity. Numerical modeling and experimental data together point to the key role of the sweat-duct in characterizing the phenomena of skin W-band resonance behavior. Significantly, however, we see no correlation between the mental state of a person and their W-band reflection response.
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