

## Improving the accuracy of personal radiofrequency measurements using a novel body-worn measurement device and comparison with measurements using exposimeters

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Human exposure to radiofrequency electromagnetic fields (RF-EMF) is often measured by personal exposimeters. However, accuracy of measurements using the available portable devices is reduced due to the presence of the human body and due to large measurement uncertainty. The aim of this study is to compare measurement results of a newly developed prototype of a multi-band body-worn distributed-exposimeter (BWDM) with two commercially available personal exposimeters (EXPOM and EME SPY 200). The BWDM prototype has been developed for simultaneous measurements of the incident power density in 11 frequency bands (LTE 800 and 2600 MHz, 900 MHz, 1800 MHz, 2100 MHz, DECT, Wi-Fi 2 GHz and 5 GHz, including uplink and downlink bands). The BWDM consists of 22 separate antennas integrated in a garment (a vest), distributed in an optimal way on the front and back of the human torso as well as right and left hips. For all frequency bands, antenna pairs are placed on diametrically opposite locations on body, to minimizing body-shielding. The BWDM was calibrated on-body under laboratory conditions for different body sizes and shapes. We are currently conducting field measurements in various indoor and outdoor microenvironments in Belgium, Spain, France, Netherlands and Switzerland. In each country, a trained research assistant is using the BWDM in parallel with EXPOM and EME SPY 200 exposimeters by walking along pre-defined measurement routes, comparing different characteristic microenvironments such as urban, suburban and rural areas, public transport infrastructure, and public areas such as universities, parks

and shopping centres. Our data will allow the comparison of the measurements of the three different exposimeters. Results will be presented at the conference. The results of the device comparisons will enable a better understanding and interpretation of existing epidemiological research results, as well as improved risk assessment and communication strategies.