

## 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-EMFs) is often measured by personal exposimeters. However, accuracy of measurements using the available commercial portable devices is reduced due to the presence of the human body and due to large measurement uncertainty. A prototype of a multi-band body-worn distributed-exposimeter (BWDM) has been developed in the laboratory of the Department of Information Technology, Ghent University in Belgium. The BWDM prototype is able to simultaneously measure 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 minimize body-shielding. The BWDM was calibrated on-body under laboratory conditions for different body sizes and shapes. In each country, a trained research assistant uses 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. This BWDM enables precise and comparative field measurements in various indoor and outdoor microenvironments in 5 different European countries: Belgium, Spain, France, Netherlands and Switzerland, and to assess the

quality of measurements used in epidemiological studies with commercially available personal exposimeters (EXPOM and EME SPY 200). 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.