

# Measurement Advancements for 5G/6G and Emerging Wireless Standards: Innovations, Precision and Standardisation

## Abstract

This workshop explores the role of metrology in 5G communication systems, focusing on precise measurement techniques for complex 5G signals, calibration of 5G equipment, and standardized performance evaluation protocols. Key topics include over-the-air measurements, RF exposure aspects, and challenges in wireless channels up to sub-THz as well as the application of robotic solutions for precise measurements. Participants will gain insights into cutting-edge research and practical applications, fostering collaboration between academia, industry, and regulatory bodies. The workshop highlights the importance of the metrology in deploying and maintaining robust networks for 5G and beyond.

## Workshop outline

The Workshop is planned to be a half day event (i.e. 3 hours 20 mins) containing 8 slots for 20-min invited talks (each 20-min slot includes Q&A). The talks will cover the following topics:

1. Opening presentation by the organizers (5 mins)
2. Four invited presentations (1 hour 20 mins)
3. Break (5 mins)
4. Four invited presentations (1 hour 20 mins)
5. Break (5 mins)
6. Panel discussion with invited speakers as panellists, moderated by the organizers followed by closing remarks (25 mins)

## Speakers

List of confirmed invited speakers and their talks:

Section I (four invited presentations) – ‘challenges, and standardisation progress’:

1. Anil SHUKLA, QinetiQ (Chair of IET Antennas and Propagation Technical Network), United Kingdom, "Application of Metrology Data in Radio Systems and Corresponding Requirements"
2. Christophe GRANGEAT, Nokia (Convenor of IEC TC106 MT3), France, "RF Exposure Assessment Methods of Base Stations: Update on the Applicable International Standards and Challenges"
3. Shoaib ANWAR, MVG, France, "Using Digital Twin Approach to Calculate Specific Absorption Rate and Absorbed Power Density for Human Electromagnetic Exposure Evaluation"
4. Mingxiang GAO, Schmidt&Partner Engineering AG, Switzerland, "Validated Traceable Measurement System for Absorbed Power Density"

Section II (four invited presentations) – ‘testbeds and measurements’:

1. Akram ALOMAINY, Queen Mary University of London, United Kingdom, "A Measurement Campaign in Sub-THz Band"
2. Emrah TAS, Federal Institute of Metrology METAS, Switzerland, "5G NR Radio Frequency Exposure Measurements from Base Stations - A Study on Traffic Beams"
3. Yunsong GUI, National Physical Laboratory NPL, United Kingdom, "A 5G NR Radiated-Two-Stage Over-the-Air Testbed and Measurements at FR2 Band"
4. Wei FAN, Southeastern University, China, "Enabling Long-Range Phase Coherent Measurement for Vector Network Analyzer: Spanning from Sub-6 GHz to Sub-THz Bands"