

IEEE Waveform Generation Measurement and Analysis Technical Committee (TC10)  
Meeting Agenda  
19 April 2022 / 11:00 AM – 1:00 PM (EDT)

1. Call to Order
2. Introductions and Roll Call
3. Approval of the Agenda
4. IEEE SA eTools
  - a. Any questions, comments, concerns
5. Working Groups Updates
  - a. Revision of IEE Std 181, IEEE Standard for Transitions, Pulses, and Related Waveforms
    - i. Lead: Nick Paulter
  - b. Revision of IEEE Std 1241, IEEE Standard for Terminology and Test Methods for Analog-to-Digital Converters
    - i. Lead: Nick Paulter
  - c. Revision of IEEE Std 1658, IEEE Standard for Terminology and Test Methods of Digital-to-Analog Converter Devices
    - i. Lead: Luca DeVito
  - d. Revision of IEEE Std 1696, IEEE Standard for Terminology and Test Methods for Circuit Probes
    - i. Lead: John Jendzurski
6. Future Meetings
  - a. Quarterly, 3<sup>rd</sup> Tuesday of the month, rotating start time, scheduled duration 2 hrs
7. Guest presentation
  - a. David Humphreys (see next page)
8. Adjourn

## Information on guest presentation

### Title of presentation:

Overview of traceability and error sources for dynamic voltage measurement

### Abstract:

This talk provides a short overview of measuring and providing traceability for  $v(t)$  with known and useable uncertainties. Direct measurement of  $v(t)$  is a difficult task as this is an open-loop system with separate source and receiver. The primary standard is based on Electro-optic sampling and different designs have been developed and compared. No design is perfect so intercomparison is important to identify flaws.

The second tier is based on commercial sampling oscilloscopes, which have a different series of impairments, and from there, the calibration passes to other instrumentation types to provide traceability for complex waveforms and parameters such as EVM (see IEEE P1765).

In this presentation some of the sources of errors, correction techniques and waveform uncertainties will be outlined.

### Presenter biography:

David A Humphreys received a BSc in electronic engineering from Southampton University, UK in 1978 and a PhD in electronic engineering from London University, UK in 1990. His thesis concerned the accurate measurement of high-speed optoelectronic devices at telecommunication wavelengths.

He joined the National Physical Laboratory, Teddington, UK in 1978 developed metrology for photodiodes at up to mm-wave frequencies, optical wavelength capabilities for optical communications and waveform metrology for RF communications. His recent interests include full-waveform characterization of the primary-standard electro-optic sampling system, RF waveforms for wireless communications, EVM, New Radio, nonlinear RF measurements and correlated waveform uncertainties. He was the coordinator for the Euramet EMRP IND51 "Metrology for RF and Optical Communications" joint research project from June 2013 until June 2016 and has participated in several other Euramet projects (IND16 "Ultrafast", SIB62 "HF Circuits", "MET5G") relating to RF, instrumentation and physical-layer metrology. He is working as a Mercator Fellow on the DFG funded METERACOM project. He is Vice-Chair of the P1765 IEEE pre-standards group on "The uncertainties in Error-Vector-Measurement (EVM)".

Dr Humphreys is a Chartered Engineer and a Fellow of the IET (UK), an IEEE Senior Member and a Research Fellow at the University of Bristol, UK. He was awarded the IEE Ambrose Fleming Premium in 1987 and has published over 100 peer reviewed journal and conference papers and a book chapter in "THz Communications, Paving the way towards Wireless Tbps."