

# Updated Status on the Activities of the EurAAP Working Group on Antenna Measurements

Lucia Scialacqua,  
Lars Jacob Foged, *Fellow, AMTA*.  
Microwave Vision Italy  
Pomezia, Italy  
lucia.scialacqua@mvg-world.com

Javier Fernández Álvarez,  
Michael Mattes  
Technical University of Denmark (DTU)  
2800 Kgs. Lyngby, Denmark  
jafealv@elektro.dtu.dk

Tian Hong Loh, *Member, AMTA*.  
National Physical Laboratory  
Teddington, UK  
tian.loh@npl.co.uk

M. Sierra-Castañer, *Fellow, AMTA*.  
Universidad Politécnica de Madrid (UPM)  
Madrid, Spain  
manuel.sierra@upm.es

**Abstract**— In the past few years, the working group (WG) on antenna measurements, being part of the European antenna and propagation association (EurAAP), has spent a great deal of effort in carrying out a whole range of antenna measurement related activities and projects. These activities cover various areas of antenna measurements and are sub-divided into different tasks, such as measurements and comparisons of reference antennas, revisions of IEEE antenna measurement standards, self-assessment measurements of facilities, and emerging techniques for antenna over-the-air (OTA) measurements. This paper gives an update of the status of these activities carried out by the EurAAP WG on antenna measurements including the initial of a new campaign based for a first time on a low directive antenna, an MVG SMC2200 monocone antenna on a circular ground plane. Moreover, the new activities in collaboration with the EurAAP WG on software and modeling tools will be presented with the aim of promoting the benefits of the synergy between measurement and simulation modeling tools.

## I. INTRODUCTION

Antenna measurements are of utmost importance in the design, development, and verification of wireless systems, as they ensure adherence to specifications. The continuous emergence of new and complex antenna technologies has resulted in increasingly stringent specifications. Consequently, there is an ongoing demand for research in measurement technologies and method to satisfy the new needs and specifications.

The European association on antennas and propagation (EurAAP) [1] working group on antenna measurements (WG5) [2] has been conducting different activities that are grouped in different tasks. The WG website [2] provides further details on description of these tasks. One of the longest-running tasks involves the measurement campaigns since 2005. Participating facilities could verify their measurement capabilities and

accuracy for internal use and to obtain or maintain official accreditations like ISO 17025. During facility comparison campaigns (Task 2), the selected reference antennas are being shipped between the participating facilities, and that measurement data is collected. Once the measurement activities are completed, the data is analyzed, compared and shared with participants, which often results in joint publications in peer-reviewed journals. Additionally, Task 6 allows participation in closed activities, where consolidated reference data from previous campaigns are used for self-evaluation by comparing them with the measured data provided by participants.

Task 5 concentrates on measuring Validation Standard Antennas (VAST) in millimeter-waves (mm-waves) to ensure accurate measurements of next-generation communication antennas in K/Ka/Q/V bands. Two other relevant tasks are Task 4, which aims to define new antenna measurement standards, and Task 7, which focuses on activities related to emerging technologies for antenna over-the-air (OTA) measurements. This paper gives an update of the status of these activities with respect to [3]. The WG on antenna measurements is also actively discussing interesting collaborative activities with WG on software and modeling tools that combines both antenna measurements and simulations whereby for this task a new measurement campaign has started to assess the measurement of antenna efficiency.

## II. UPDATED STATUS OF THE TASKS OF THE WG OF ANTENNA MEASUREMENTS

An update of the status of the tasks of the WG are described in the following sessions.

### A. Task 2: Intercomparison campaign

Over a span of more than 10 years, the intercomparison activities of Task 2 have garnered significant participation from



and the IEEE Std. 1720™-2012 "Recommended Practice for Near Field Antenna Measurements" [22]. The motivation behind these activities is that, according to recent IEEE-SA policies, a standard cannot simply be reaffirmed after ten years of its approval, even if it is still considered relevant. Therefore, a WG within the Antennas and Propagation (AP) Standards Committee must review it, or the standard will expire. It is expected that the complete revision of the IEEE Std. 1720™-2012 will be finalized by the end of 2023.

#### E. Task 7: New and emerging technologies for antenna OTA measurements

This three-year task was proposed and approved in 2020 with the aim of fostering collaborative research in new and emerging technologies for antenna OTA measurements. The scope of activities encompasses various aspects, including MIMO OTA measurements utilizing different methods, as well as AiP (Antenna in Package) or AiM (Antenna in Module) measurements. However, due to the impact of COVID, the progress of these activities was delayed, leading to a rescheduling of the timeline to 2022-2025. Updates on this task will be presented during the conference.

#### F. Link between measurement and numerical simulation

During the past year, a fruitful collaboration began between the antenna measurements group and the simulation group [23] for the initiation of which activity could be of common interest. In this regard, it was thought to start an intercomparison campaign of an AUT that could be measured and simulated. Both WGs has agreed to start the collaboration by focusing initially on the measurement and simulation of antenna total efficiency. The AUT is made by Ignion, which operates with multi-bands between 698 MHz – 2690 MHz with of dimension of 150 mm × 150 mm × 1.6 mm and an SMA-type connector (ready to be tested) [24], see Figure 4.

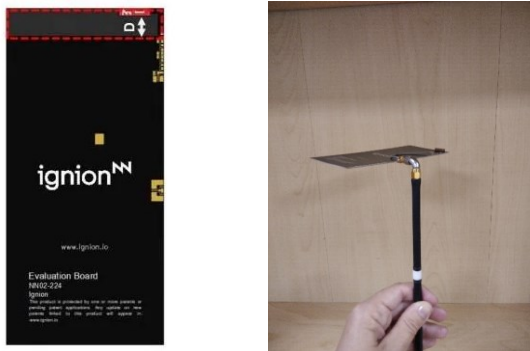


Figure 4. Ignion antenna - evaluation Board NN02-224 [24] antenna (left); antenna with feeding cable (right).

The frequency band between 1.71 GHz and 2.69 GHz has been selected for testing. AUT set-up has been finalized and the campaign has begun since April 2023. Already three participants have measured the antenna and a four measurement is in progress. Preliminary results (processed using techniques like those adopted during Task 2) will be presented at the event. So far already eight participants have indicated their intention to test the antenna.

### III. CONCLUSION

In this paper we have presented the updates and highlights with respect to of the activities carried out within the EurAAP WG on antenna measurements. For Task 2, a new intercomparison campaign is going to be started with a low directive antenna (MVG monocone SMC2200) to meet the measurement needs of increasingly less directional antennas, such as in the automotive industry. Another relevant update consists of the new intercomparison campaign started combining measurements and simulations for determination with this campaign the various participants will be able to test their measurement proficiency not only about the measurement of radiation patterns, but also for the determination of antenna efficiency, which is very important especially for wireless devices.

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