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Reverberation Chamber for Testing Reconfigurable Intelligent Surface in 5G System at mm-Wave

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The sixth generation (6G) communication systems are upcoming, enhancing the key performance indicators (KPIs) and by supporting various use cases also facilitated by the emerging technologies and techniques. Certainly one of them is the reconfigurable intelligent surface (RIS) that are gaining momentum in the telecommunications community The RIs can be integrated in the communication systems for localization, sensing, enhancing the coverage, etc [1, 2]. Nevertheless, the integration of RISs with a commercial 5G systems is challenging. In our laboratory we reproduced a real-life wireless scenario by means of the reverberation chamber (RC) by opportunely load and tune the absorbing material according to the standard [3]. In this case the RC allows us to perform tests in a controlled way without move, every time, equipment and instruments allowing us to save time. Current base station(s) (BSs) are made with state-of-the-art technology and it is crucial to understand and test how they work when we want to integrate a wireless device. In particular, 5G antenna implements the beamforming with, also thanks to the high gain, allows to cover a large area. In spite of the advantages offered by the BSs, the possibility to integrate devices in the system, e.g. RIS, helps to improve the overall system performance and in some scenario can be decisive to maintain a good connection between BS and user equipment (UE). The KPIs of a commercial 5G system at 26 GHz has been explored in [4] where the RC has been used as facility test. In this measurement campaign we employed a RIS, provided by Greenerwave [5], in order to evaluate their benefit in the overall communication link by using a 5G commercial BS. The RIS is the key enabler of the smart radio environment which binds the transmitter and receivers in a smart and programmable way also in complex propagation environments such as the RC. This work has been supported by the EU H2020 RISE-6G Project under Grant number 101017011.

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