

Keynote Speech 3

# Millimeter-wave Technology Trends for 5G and Wireless Transmission Applications and Technologies

Renato Lombardi

*Huawei, Italy Research Center, Milan, Italy*

**Thursday, 21 September 2017, 16:30-17:00**

**Abstract** – High interest in millimeter-wave bands has risen in the recent years due to the enormous amount of under-utilized bandwidth that lies in this part of the electromagnetic spectrum. The significant advantages offered by the propagation characteristics in terms of frequency re-usability and large channel bandwidths, make millimeter-wave, and sub-millimeter, suitable for the very high capacities required by 5G enhanced Mobile BroadBand (10 Gbps peak throughput and 10 Mbps/m<sup>2</sup>). The millimeter-wave bands can be suitably used for the access networks to increase the throughput to the User Equipment and backhaul/front-haul of the base stations. At the same time the use of millimeter-wave bands, thanks to the very compact antenna size makes products "blend" in the environment, allows the densification of the cells in dense urban scenarios. From the considerations outlined so far it is relatively easy to evince the importance that the research will play in the next years in the many areas that will be necessary to cover in order to develop systems capable to operate at very high capacity with spectral efficiency, high performance, at frequencies up to 175 GHz in medium term and above 240 GHz in the long term.



**Renato Lombardi** is Head of Huawei Italy Research Center, Vice President of Huawei's Microwave Product Line. In these roles, he oversees the development of microwave and millimeter-wave technologies and the implementation of innovative mobile broadband backhauling solutions all over the world. Renato Lombardi joined Huawei in 2008, founding the Huawei Research Center in Milan, Italy. In 2011, he was awarded the title of "Fellow of Huawei".

Renato has more than 20 years of experience in the microwave industry. He previously led the Microwave Technical Sales department of Siemens, where he was later appointed Head of the Business and Product Management and then Head of Research and Development. He was member of the integration team of for the Siemens and Nokia joint venture in 2006, and later became the Head of Product Management of the Microwave Business Line where he oversaw the product portfolio, strategic planning as well as profit and loss of the product lines. In 2015 Renato Lombardi has been elected Chairman of the ETSI Industry Study Group mWT (millimeter-Wave Transmission). Renato Lombardi graduated from the Politecnico of Milano, the largest technical university in Italy with a Master's Degree in Electronic Engineering.