MAURY MICROWAVE AND NATIONAL PHYSICAL LABORATORY (NPL) JOIN FORCES TO ADVANCE CRYOGENIC MEASUREMENT CAPABILITIES FOR QUANTUM COMPUTING

[Ontario California and Teddington, England, February 15, 2024] — Maury Microwave, a prominent manufacturer of precision RF and microwave calibration standards, has proudly announced a collaborative effort with the National Physical Laboratory (NPL), the UK's National Metrology Institute. This partnership aims to advance cryogenic measurement capabilities for quantum computing, addressing the critical need for reliable microwave technologies operating at extremely low temperatures.

Practical quantum computing systems require microwave components that can operate seamlessly at cryogenic temperatures down to tens of milli-kelvin (mK). Quantum operations rely on a network of microwave components operating at various cryogenic temperatures, demanding optimal performance of both classical and quantum microwave devices. To meet this challenge, Maury Microwave and NPL have joined forces through the UK's National Quantum Technologies programme. NPL, with its focus on developing new measurement capabilities, has taken on the task of addressing microwave test and measurement challenges in quantum computing. The collaboration includes the characterization of various devices at cryogenic temperatures by analyzing their scattering (S-) parameters. NPL has developed specialized cryogenic calibration techniques using calibration standards and phase-matched cables provided by Maury Microwave. These techniques enable the precise de-embedding of effects from the test setup, ensuring accurate characterization of the devices.

Prof. Nick Ridler, NPL Fellow and Department Head of Science, stated, "These capabilities are developed with the aim to support industry and academia to create new and improved products for quantum computing." Dr. Manoj Stanley, a senior scientist at NPL, stated, "We utilized our decades of expertise in microwave metrology to characterize the performance of these standards and cables at cryogenic temperatures and evaluated their suitability at temperatures down to tens of mK. Maury Microwave is one of the leading manufacturers of precision RF and microwave calibration standards and RF coaxial test cables and has a long track record in this field. It has been a fantastic collaboration with the team at Maury Microwave, and we hope that the outputs benefit the global quantum community."

"The collaboration between Maury Microwave and the National Physical Laboratory (NPL) marks a significant step forward in advancing cryogenic measurement capabilities, contributing to the progress of quantum computing technologies," remarked Dr. Jonas Urbonas, Director of Engineering at Maury Microwave. "The outcomes of this collaboration are expected to have a lasting impact on the development of quantum computing systems worldwide."

A selection of NPL's work on calibration and measurements at cryogenic temperatures leveraging Maury Microwave's calibration standards and cable assemblies include:

1. S. -H. Shin, M. Stanley, J. Skinner, S. E. de Graaf and N. M. Ridler, "Broadband Coaxial S-Parameter Measurements for Cryogenic Quantum Technologies," IEEE Trans. Microw. Theory Tech., doi: 10.1109/TMTT.2023.3322909. (Early Access) -- https://ieeexplore.ieee.org/document/10287150
2. M. Stanley, S.-H. Shin, J. Skinner, J. Urbonas, and N. Ridler, "Characterising Scattering Parameters of Coaxial Microwave Devices at Milli-kelvin Temperatures for Quantum Computing Technologies," Proc. Eur. Microw. Conf. (EuMC), Berlin, Germany, 2023, pp. 150–153. -- https://ieeexplore.ieee.org/document/10290560
3. J. Skinner, M. Stanley, J. Urbonas, S. de Graaf, T. Lindström, and N. Ridler, "Characterizing Precision Coaxial Air Lines as Reference Standards for Cryogenic S-parameter Measurements at Milli-kelvin Temperatures," IEEE MTT-S Int. Microw. Symp. Dig., San Diego, CA, USA, 2023, pp. 561–564 -- https://ieeexplore.ieee.org/document/10188171
4. M. Stanley, M. Salter, J. Urbonas, J. Skinner, S. Shin, S. E. de Graaf. and N. M. Ridler, "Characterizing S-Parameters of Microwave Coaxial Devices with up to Four Ports at Temperatures of 3 K and Above for Quantum Computing Applications", IEEE Trans. Instrum. Meas., Accepted for publication.

About Maury Microwave:

Our mission is to give our customers confidence in their RF through THz measurements and models. We accomplish this by providing best-in-class and fully proven characterization solutions, components and services. We help the world's leading manufacturers in the wireless technology chain build better products and bring them to market faster. For more information, please visit www.maurymw.com

About the National Physical Laboratory (NPL):

NPL is the UK's National Metrology Institute, providing the measurement capability that underpins the UK's prosperity and quality of life.

From new antibiotics to tackle resistance and more effective cancer treatments, to secure quantum communications and superfast 5G, technological advances must be built on a foundation of reliable measurement to succeed. Building on over a century's worth of expertise, our science, engineering and technology provides this foundation. We save lives, protect the environment and enable citizens to feel safe and secure, as well as support international trade and commercial innovation. As a national laboratory, our advice is always impartial and independent, meaning consumers, investors, policymakers and entrepreneurs can always rely on the work we do.

Based in Teddington, south-west London, NPL employs over 600 scientists. NPL also has regional bases across the UK, including at the University of Surrey, the University of Strathclyde, the University of Cambridge and the University of Huddersfield's 3M Buckley Innovation Centre.