Statement of Intent

between

Electromagnetic Metrology Division
National Institute of Metrology
of the Peoples's Republic of China

and

Quantum Measurement Division
Physical Measurement Laboratory
National Institute of Standards and Technology
of the United States of America

The Electromagnetic Metrology Division at the National Institute of Metrology (NIM) and the Quantum Measurement Division of the Physical Measurement Laboratory (PML) of the National Institute of Standards and Technology (NIST) continue to find excellent opportunities for cooperation and collaboration where there would be mutual benefit for each institution or for fostering global trade and commerce. Based on discussions during recent visits between members of these organizations, this Statement of Intent is to foster joint efforts, including information exchange and appropriate staffing exchanges. This statement of intent builds upon the previous letter of intent dated 12 September 2007 between NIM and the former Electronic and Electrical Engineering Laboratory of NIST and is consistent with the broader statement of intent dated 17 November 2008 between NIM and NIST.

This Statement of Intent is proposed to pursue or explore the following joint efforts in the areas of electrical metrology and the electronic realization of mass.

- **Quantum Device Fabrication** – As the Electromagnetic Metrology Division at NIM develops in-house fabrication capabilities, PML/NIST intends to provide advice and guidance in issues relevant to the fabrication of Quantum Hall resistance (QHR) devices and to assist in the diagnosis of issues, which may arise in the NIM facilities.
- **10V PJVS** - NIM intends to acquire from PML/NIST a 10V Programmable Josephson Voltage Standard System. If pursued the details of such a purchase will be the subject of separate legal agreement.
- **AC QHR** – While NIST has no active research in this area it has a new research thrust aimed at alternative approaches to impedance and will be exploring its relationship to AC QHR. Thus, PML/NIST intends to share its relevant expertise, its new ideas, and its general interest in this area. As NIM develops capability for AC QHR metrology, PML/NIST intends to provide relevant expertise and knowledge to NIM.
- **AC-DC transfer** – NIM is developing the capability to fabricate and use next generation multijunction thermal converters (MJTC) devices for AC-DC transfer. PML/NIST has

substantial capability in this area and is willing to engage with NIM to aid in their development.

- **Electric Power** – NIM and PML/NIST are both developing new capabilities to support the Smart Grid activities. Staff exchanges and interaction between our institutions will be valuable for facilitating this development and to foster improved technical knowledge of our two countries power industries.
- **Capacitance** – NIM and PML/NIST both have programs to develop new calculable capacitors for the primary realization of the capacitance unit and engagements and interactions may prove valuable to both programs.
- **Electronic Kilogram** – The PML/NIST and NIM programs (the Watt Balance and the Joule Balance) share the common goal for providing a realization of mass based on high-accuracy and precision electrical metrology. These two programs share many common metrological challenges and thereby provide many opportunities for information exchange in order to develop and share best practices.

This list of activities is not intended to be complete nor to obligate either side. In each case where further engagement is deemed mutually beneficial, the two parties will separately agree to the details of the interactions and or collaborations. To the extent possible such agreements will be accomplished in an informal manner to better expedite these important but limited engagements.

This document is a Statement of Intent of the parties to collaborate and is not a legally binding document. No legal rights or responsibilities are created by the terms herein and all activities are subject to applicable national laws, including export controls. Activities contemplated by this document are subject to the availability of funds and other necessary resources to the parties. Neither party commits to obligating funds to the activities suggested herein. If the parties intend jointly to fund any activity the funding and roles and responsibilities of the parties will be the subject of a separate agreement. The effective period of this Statement of Intent is five (5) years from the last date signed.

For the Electromagnetic Metrology Division of the National Institute of Metrology,

_____

Dr. He Qing, Director
Electromagnetic Metrology Division
National Institute of Metrology

Date: _____

For the Quantum Measurement Division of the Physical Measurement Laboratory of the National Institute of Standards and Technology,

_____

Dr. Carl J. Williams, Chief
Quantum Measurement Division
Physical Measurement Laboratory
National Institute of Standards and Technology

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For the Electromagnetic Metrology Division of the National Institute of Metrology,

Dr. He Qing, Director
Electromagnetic Metrology Division
National Institute of Metrology

Date: March. 7. 2012

For the Quantum Measurement Division of the Physical Measurement Laboratory of the National Institute of Standards and Technology,

Dr. Carl J. Williams, Chief
Quantum Measurement Division
Physical Measurement Laboratory
National Institute of Standards and Technology

Date: March 7, 2012