

Measurement Comparison: 2.4 mm 50 GHz Thermocouple Power Sensor Technical Protocol

Foreword

PTB and METAS have agreed on a bilateral inter laboratory comparison of a radio frequency (RF) 2.4 mm thermocouple power sensor.

The main goal of the comparison is the determination of the calibration factor in the frequency range of 100 kHz to 50 GHz as well as the complex input reflection coefficient of the sensor. This comparison offers the participants the possibility to verify their measurement procedures including the evaluation of measurement uncertainty and it provides a possibility to find and fix errors.

Participants

- Physikalisch-Technische Bundesanstalt PTB, Bundesallee 100, D-38116 Braunschweig, Germany
- Federal Office of Metrology METAS, CH-3003 Bern-Wabern, Switzerland

Pilot laboratory

Metas acts as the pilot lab, acts as a coordinator of the EURAMET project and writes the reports.

Device under calibration

The measurement standard is a 2.4 mm thermocouple power sensor type NRP-Z56, sn101446 (R&S) with a frequency range DC to 50 GHz (2.4 mm (male) - connector) and a dynamic range from -35 dBm to + 20 dBm.

The device is provided by Metas.

Measurands

The measurands of this comparison are:

- Calibration factor (relative to the calibration factor at 100 kHz) at the nominal power level of 1 mW (0 dBm), expressed in W/W at total 56 test frequencies: 100 kHz, 50 MHz, 100, 200, 500 MHz, 1 GHz, 2, 3 ... 25, 26, 26.5, 27, 28 ... 49, 50 GHz.
- Complex input reflection coefficient at the same frequencies, expressed in real and imaginary parts.

Documentation of the results

The participants are asked to document their results in the form of a calibration certificate and a GUM compliant measurement uncertainty budget.

Analysis and report

The analysis of the comparison will be confidential and the initial report will only be available to the participants. After approval by all participants the final report with the results of the comparison will be published in the EURAMET database.

Time table

Date	Participant	transfer to
March 2010	METAS measurements	-
August 2010	METAS	PTB
January 2011	PTB measurements	
March 2011	PTB	METAS
April 2011	METAS control measurements	
May 2011	Metas draft report	
June 2011	discussion of the results and corrections	
July 2011	Final report to EURAMET	