National Institute of Metrology (Thailand)

Ministry of Higher Education, Science, Research and Innovation

Certificate of Calibration

NSC-TISI-TIS 17025
Calibration 0144

Certificate No. : EL-0016-23

Issued by : Laser Power Laboratory, Electrical Metrology Department

MEASUREMENT ITEM	:	Laser Power / Energy Meter
MANUFACTURER	:	Ophir
MODEL/TYPE	:	VEGA
SERIAL NUMBER	:	3096631
CUSTOMER	:	Treat Med Co., Ltd. 70 Soi Rattanathibet 28 Yaek 2, Bangkrasor Muangnonthaburi Nonthaburi 11000
MEASUREMENT DATE	:	20 September 2023

The reported measurement result relates only to the measurand and applies only at the time of measurement.

Reference:	**Date:**	**Approved by:**	**Performed by:**
EMC0454-01/23	22 September 2023	(Sivinee Sawatdiaree)	Kanokwan Nontapot (Kanokwan Nontapot)

Technopolis Office, 3/4-5 Moo 3, Klong 5, Klong Luang, Pathumthani 12120 Thailand, Telephone: 66 2577 5100, Facsimile: 66 2577 3659

ENVIRONMENTAL CONDITIONS

The measurement was carried out in an ambient temperature of (23.0 ± 1.0) °C and relative humidity of (50 ± 15) %.

MEASUREMENT METHOD

The unit under calibration (UUC) was calibrated by comparing its reading against the power measured by NIMT's reference standard.

UNCERTAINTY OF MEASUREMENT

The stated measurement uncertainties are the expanded measurement uncertainty obtained from the combined standard measurement uncertainties multiplied by the coverage factor $k = 2$. They are determined in accordance with JCGM 100: 2008 "Evaluation of measurement data - Guide to the expression of uncertainty in measurement". The values of the measurand lie within the assigned range of values with a probability of approximately 95 %.

TRACEABILITY

This certificate provides traceability of measurement to recognized national standards, and to the realization of the International System of Units (SI).

MEASUREMENT RESULTS

50(150)A-BB-26

Wavelength (nm)	Power Level	Calibration Factor (UUC/STD)	Uncertainty
1 064	1 W	0.997	4.0 %
10 600	1 W	1.055	2.0 %
	3 W	1.076	2.0 %
	8 W	1.089	2.0 %

3A

Wavelength (nm)	Power Level	Calibration Factor (UUC/STD)	Uncertainty
10 600	1 W	0.818	2.0 %
	3 W	0.826	2.0 %

Calibration Conditions :

1) Beam diameter ($1/e^2$) : approximately 9 mm
2) Incident laser beam position : detector's mechanical center

End of Certificate of Calibration