Measurement Standards Laboratory of New Zealand

Report on the Illuminance Calibration of a COREInsight STD003 Tag, Serial Number 0000300831

Report No. Photometry/2024/1039, 15 April 2024

ISSUED BY:

Measurement Standards Laboratory of New Zealand.

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All results quoted in this report are directly traceable to the national measurement standards held by the Measurement Standards Laboratory of New Zealand (MSL). MSL is New Zealand's national metrology institute and operates within Callaghan Innovation.

CIPM MRA

This certificate is consistent with the capabilities that are included in Appendix C of the MRA drawn up by the CIPM. Under the MRA, all participating institutes recognise the validity of each other's calibration and measurement certificates for the quantities, ranges and measurement uncertainties specified in Appendix C.
For details see www.bipm.org

ACCREDITED IANZ CALIBRATION LABORATORY

Accreditation Number 1

All measurements reported herein, unless otherwise noted, have been performed in accordance with the laboratory's scope of accreditation. *For details see www.ianz.govt.nz*

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Description

One COREInsight Bluetooth Low Energy (BLE) STD003 tag with an embedded OPT3004 Ambient Light Sensor (ALS). A COREInsight Reader was also used to read the data output from the tag.

Identification

The tag was identified by the serial number '0000300831' and MAC address '2C:DC:78:04:97:1F'. The reader was identified by the serial number '4C046FDAC75D9AA279C-6C85'.

Client

Core Transport Technologies NZ Ltd, 105 Trafalgar Street, Nelson 7010.

Dates of Calibration

19 – 23 January 2024, 5 March 2024.

Objective

To calibrate the tag for the measurement of illuminance at 10 lux, 100 lux, and 1000 lux.

Technical Procedure

MSLT.O.042.006.

Method of Calibration

The COREInsight tag was oriented with its receptor in the vertical plane and at normal incidence to the light flux from a tungsten filament lamp operating at a colour temperature of 2856 K. A calibrated reference meter was also mounted in the same vertical plane and was used to determine the calibrated values of illuminance. At an illuminance of 10 lux, a neutral density filter was used to attenuate the illuminance at the detectors. The COREInsight reader was used to connect to the COREInsight tag to output the captured data. The calibration is appropriate only for similar light sources (see Notes 3 and 4).

Conditions

The calibration was carried out at a room temperature of 22.8 ºC ± 2.0 ºC.

Results

The table below reports the tag illuminance readings during the calibration, the correction multiplier, *C*, the expanded uncertainty in the correction multiplier, *U*(*C*), and the coverage factors.

Before making a measurement with the tag, the offset, *o*, should be measured again with the detector covered (see Note 5).

To obtain a corrected value of illuminance, *E*, from a tag reading, *r*,

i. Subtract the offset, *o*, from *r*,
ii. Multiply the difference by the correction multiplier, *C*,

i.e., $E = (r - o) \times C$.

Illuminance Readings (lux)	***C***	***U*(*C*)**	**Coverage Factor**
493.76	2.025	3.6 %	1.99
49.92	2.004	2.0 %	1.98
5.00	2.003	5.9 %	3.18

Note 1: The tag was not adjusted.

Note 2: The effective measurement plane of the COREInsight tag was taken to be the top surface of the tag.

Note 3: These measurements were made using a light source with a colour temperature of 2856 K. The correction multipliers required when measuring other light sources will differ from those above if the tag detector's spectral response differs markedly from the defined photopic response. This calibration has not characterised the photopic response of the detector. See MSL Technical Guide 34 – Spectral Mismatch of Illuminance Meters for more information.

Note 4: These measurements were made using light from a point source at normal incidence to the meter. Should the tag detector's angular response differ markedly from a cosine response then the results in this calibration report do not apply when the tag is used to measure off-axis or extended light sources (e.g., long fluorescent tubes). If so, its angular response should be characterised further.

Note 5: During calibration, the offset for the COREInsight tag was found to be 0 lux. If the offset value, *o*, is significantly different from this offset value, the instrument may require maintenance and recalibration.

Note 6: The calibration is only valid for the displayed tag illuminance readings shown in the table above.

Note 7: When evaluating the uncertainty in a calibrated value of illuminance at the time of measurement, additional components of uncertainty should be considered. For example, the effect on the data of a fixed-digit display format needs to be considered.

Uncertainty

All expanded uncertainties quoted in this report are for a 95% level of confidence. See the "*Guide to the expression of uncertainty in measurement JCGM 100:2008*" (BIPM, 1st edition, 2008) for an explanation of terms.

These uncertainties are calculated by combining the uncertainties of the calibration process (including those of the reference standards) with those associated with the short-term behaviour of the equipment.

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