

	REPORT – Measurements of lighting of the V4 Package station	Page 1 of 12
		Issue 1
		Date of issue: 22.07.2014

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1. Introduction

Below the results of measurement are presented of intensity of light emitted by the V4 type module package station. The test was executed for the order of the firm Integer.pl S.A. The measurement was taken inside of ta building providing a relevant level of blackout.

The measurement was realized on 17.07.2014 between 21:00 and 23:00 hrs. Measurement points and range were corrected in reference to the space available in the hall.

The following measurements were realized:

- Intensity of light on the user's panel,
- intensity of light shed on the horizontal surface of ground in front of the package station (0m) and on height of 1.2m in distances of 3.5m and 5m,
- Intensity of light shed on the horizontal surface of ground in front of the package station (0m) and on height of 1.2m in distance of 0.8m ,
- Intensity of light shed on the vertical surface in front of the package station, measurement on height of 1.5m.

2. Measuring instruments

Measurement of intensity of light was realized using light intensity meter: KYORITSU 5202



Drawing 2.1. Luxmeter KYORITSU 5202

Basic technical parameters of the luxmeter:

Model	5202
Serial number	F0003962
Certificate number	2014/06/008/L/DASL
Date of examining	June 2014
Measuring range	0.1 = 19990Lux
Preciseness (23 ⁰ C±5 ⁰ C)	200Lux = ±(4%rdg + 5rdg) 2000Lux = ±(4%rdg + 5rdg) 20000Lux = ±(5%rdg + 4rdg)
Working temperature	0-50 ⁰ C

Table 2.1. Technical data of the luxmeter

In order to realize measurement of intensity of light shed on the horizontal surface on height of 1.2m and on the vertical surface on height of 1.5m an instrument was used providing correct position of the photocell ergo its positioning and orientation.

3. Place of measurement

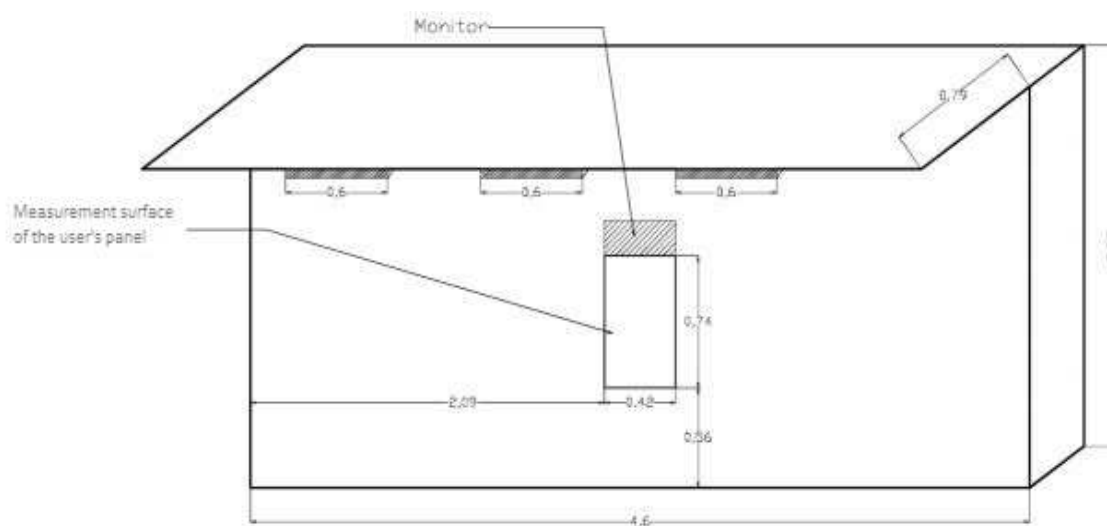
Measurements were realized inside of a building, at a place with high level of blackout. The air on the area of measurement was clear. During the first stage of realization of measurements the background light intensity measurement was realized (lighting of the package station and the monitor switched on). The measurement was realized on the area in front of the package station, on the ground surface – the result obtained was 0.2 – 0.3Lux.

Background	0.2 – 0.3 Lux
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Table 3.1. Background light intensity

4. Object of measurement

Lighting of the V4 package station comprises 3 lamps, each 0.6m long, mounted in the roofing, removed from the surface of package station wall for ab. 0.8m, directed towards the package station. From the outside of the package station the lamps are covered by roofing elements, thus completely invisible. Location of the lamps is presented on the below drawing.



Drawing 4.1. Dimensions of the V4 package station (measurements in meters, demonstrative drawing).

5. Way of measurement

5.1. User's panel

Measurement of intensity of light shed on the area of user's panel (comprising the place of operating while using the package station). The map of measurement points is presented on drawing No. 6.1 and so are the measured values. The measurement area does not comprise the monitor.

5.2. Measurement of intensity of light shed on the ground surface for different distances from a package station

The measurement was realized on points, which had been marked earlier on the ground. Drawings 6.2 and 6.4 present the map of measurement points with the values obtained. The results presented on drawing 6.4 comprise the direct area, on which operations related to use of the package station are performed.

5.3. Measurement of intensity of light shed on a horizontal surface on height 1.2m above the ground for different distances from a package station

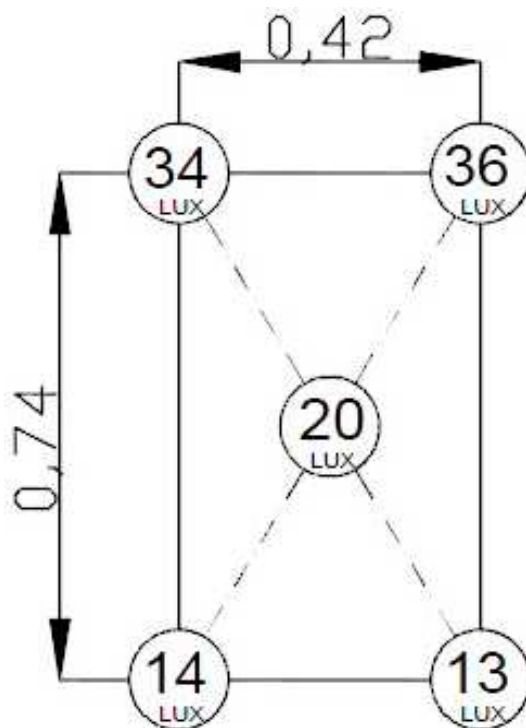
The measurement was realized on points, which had been marked before on height of 1.2m above the ground. Drawings 6.3 and 6.5 present the map of measurement points with the values obtained. The results presented on drawing 6.5 comprise the direct area, on which operations related to use of the package station are performed. A relevant device was used in order to keep constant and correct height and correct orientation of the photocell in respect to the ground.

5.4. Measurement of intensity of light shed on a vertical surface on height 1.5m above the ground

The measurement was realized on points, which had been marked before. Drawing 6.6 presents the map of measurement points with values obtained. The measurements were realized every 1m. A relevant device was used in order to keep constant and correct height and correct orientation of the photocell in respect to the ground. The measurement was realized on height 1.5m above the ground on vertical surface.

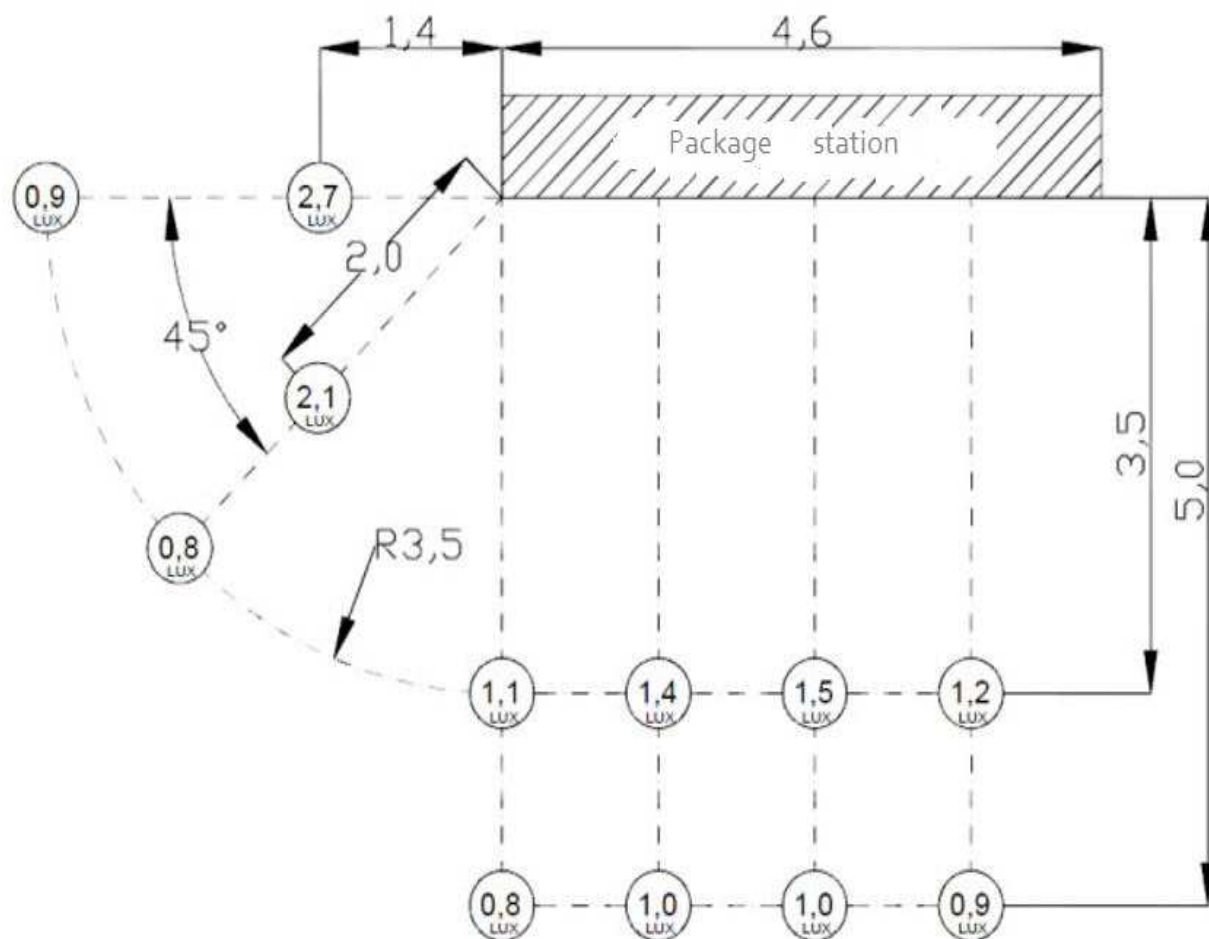
6. Results

6.1. Measurement of intensity of light shed on the user's panel surface



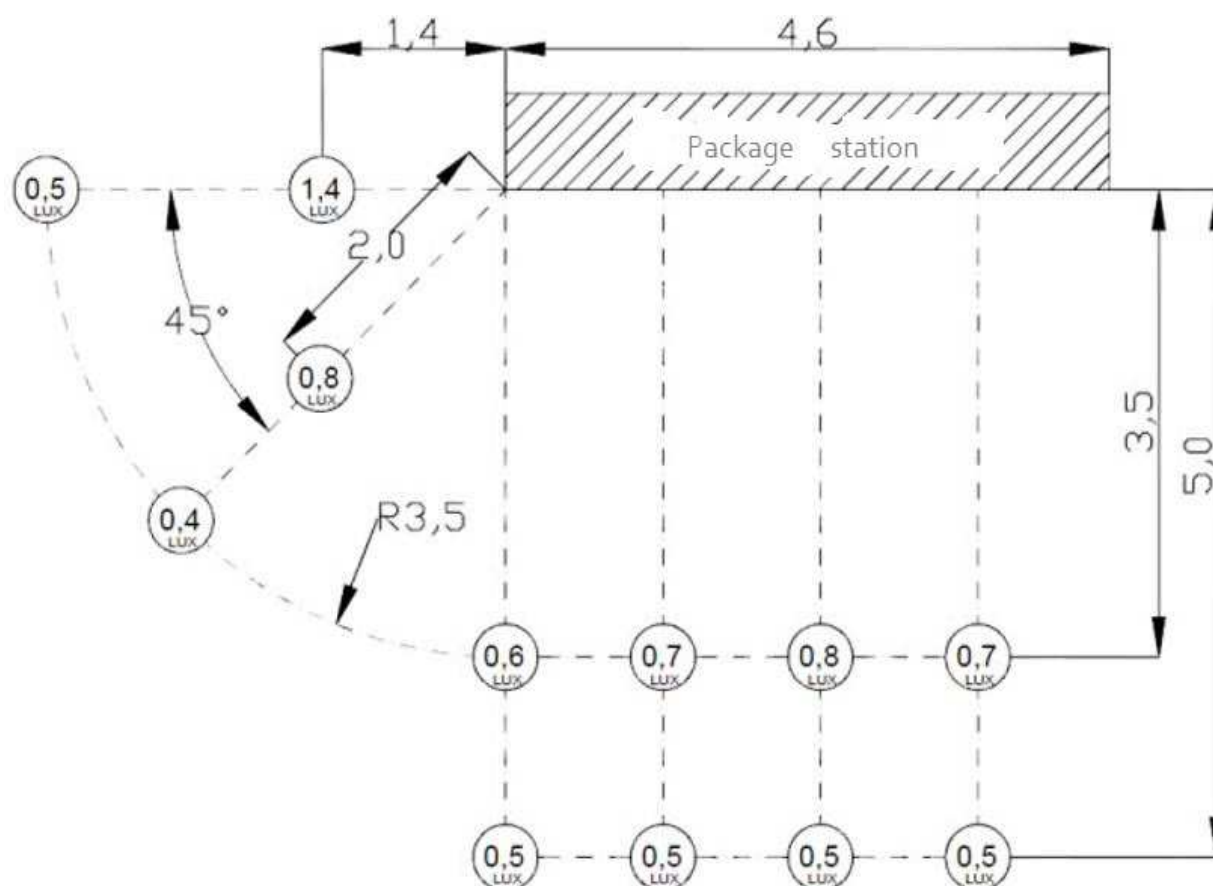
Drawing 6.1. Intensity of light shed on the user's panel (dimensions in meters)

6.2. Measurement of intensity of light shed on the ground surface in distances 3.5m and 5m from the package station



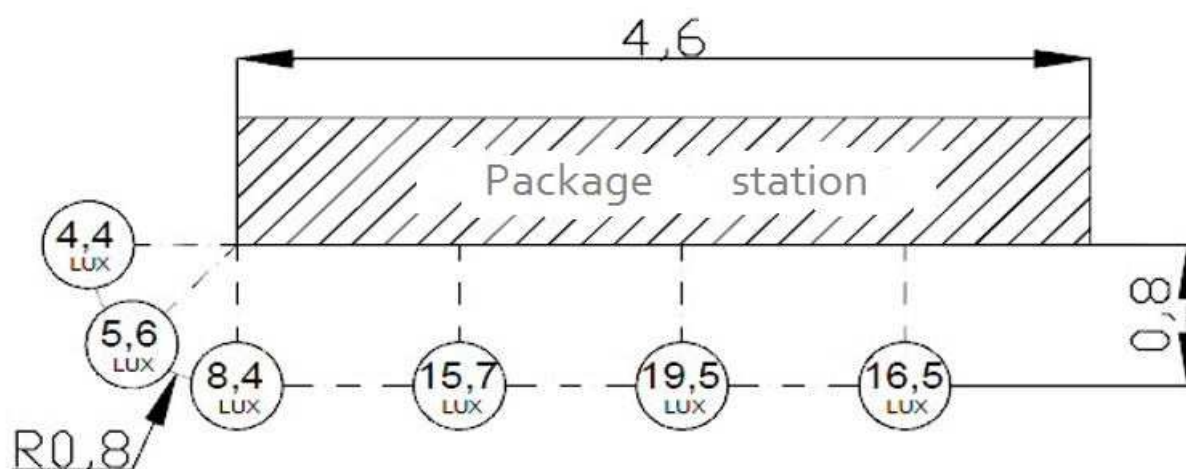
Drawing 6.2. Intensity of light shed on the surface area in distance of 3.5m and 5m from the package station (dimensions in meters)

6.3. Measurement of intensity of light shed on a horizontal surface on height 1.2m above the ground in distances 3.5m and 5m from the package station



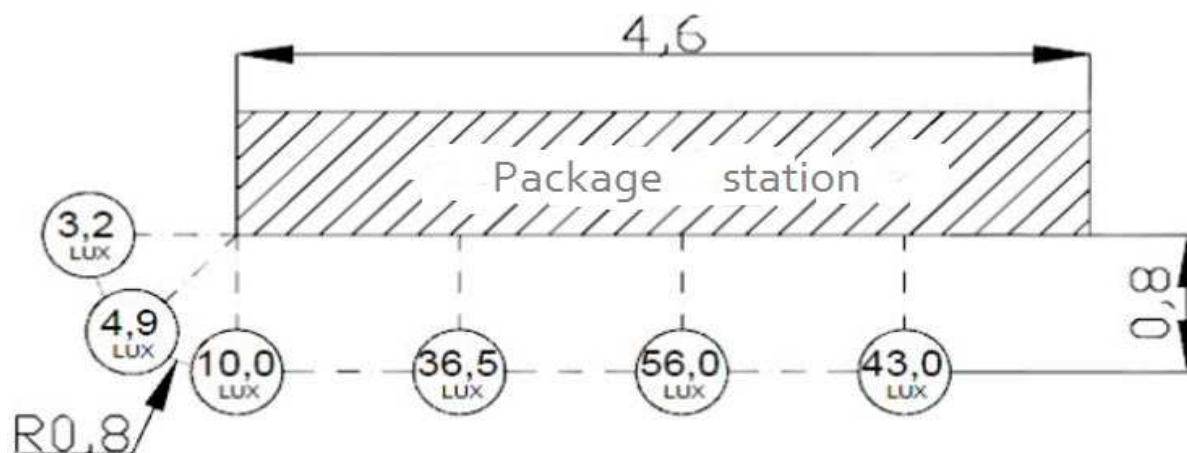
Drawing 6.3. Intensity of light shed on the horizontal surface on height 1.2m above the ground in distance of 3.5 and 5m from the package station (dimensions in meters).

6.4. Measurement of intensity of light shed on the ground surface in distance of 0.8m



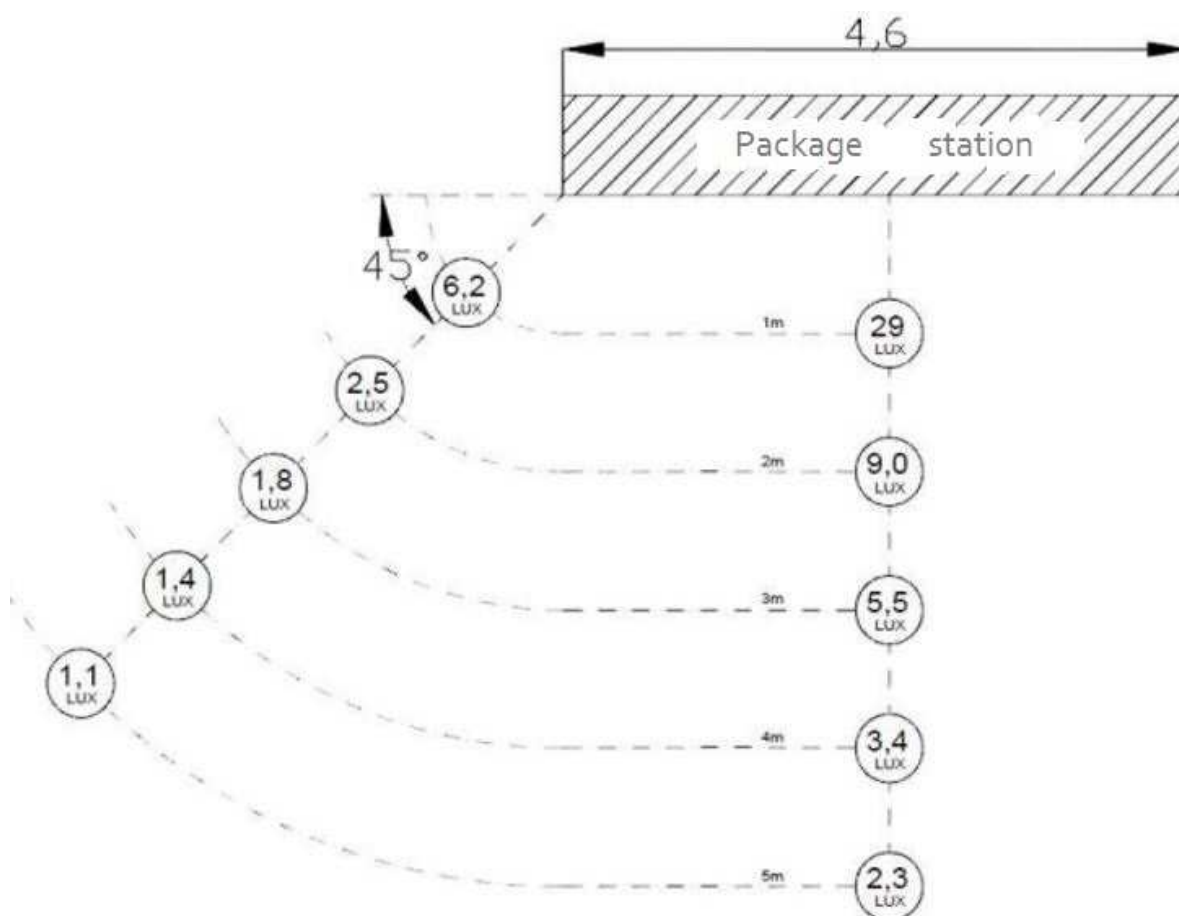
Drawing 6.4. Intensity of light shed on the ground surface in distance of 0.8m from the package station (dimensions in meters)

6.5. Measurement of intensity of light shed on the horizontal surface on height 1.2m above the ground in distance 0.8m from the package station



Drawing 6.5. Intensity of light shed on the horizontal surface on height of 1.2m above the ground in distance of 0.8m from the package station (dimensions in meters)

6.6. Measurement of intensity of light shed on the vertical surface on height 1.5m



Drawing 6.6. Intensity of light shed on the vertical surface on height 1.5m (dimensions in meters)

7. Summary

- Main lighting fittings of the package station are oriented towards the package station, moreover, they are mounted in the roofing and covered with the roofing elements from the outside, which prevents light leakage in unwanted directions,
- Measured zone lighting of the user's panel area comprising place of operating and excluding the monitor: 13-34Lux,
According to the requirements of IESNA G-1-03: lighting of the operator's panel should be 150Lux,
- Measured lighting on the ground surface level in front of the package station in distance of:
 - 3.5m is up to 1.5Lux;
 - 1.4m (in direction tangential to the surface of package station) 2.7Lux
 - 2.0m (in direction oriented in the angle 45° according to drawing 6.2) 2.1 LuxAccording to the requirements of IESNA G-1-03 lighting of the ground surface in the radius of 3.5m from the device should be 100Lux.
- Measured lighting on the ground surface in front of the package station in distance of 5.0m is 0.8 – 1.0Lux.
According to the requirements of IESNA G-1-03 the average lighting of ground surface in the radius of 15.2m and if an adjacent parking lot is available, in the radius of 18.5m should be 20Lux.
- Measured lighting in distance of 0.8m is on the ground up to 19.5m and on height of 1.2m above the ground in distance of:
 - 0.8m up to 56.0Lux
 - 3.5m up to 0.8Lux
 - 5.0m ab. 0.5Lux

According to the requirements of IESNA G-1-03 lighting should be in compliance with requirements of the monitoring for relevant operation of the monitoring and possibility to identify criminal acts.

- The value of intensity of light shed on vertical plane on the area in front of the package station on height of 1.5m was measured for the Ev factor. The results are presented on drawing 6.6. For distance from the package station of 4m light intensity (Ev) is 3.4Lux and at distance of 5m the intensity drops to 2.3Lux. According to the requirements for the Ev factor (lighting shed on a vertical plane) presented in CIE 150:2003 for the time of night lights-out, in the zone:
 - E4, Ev factor < 5 lux (urban area: the area of high light intensity – commercial zone, city/town centers, areas featuring high night activity)
 - E3, Ev factor < 2 lux (suburban area: the area of medium light intensity – industrial or living areas in suburbs)
 - E2, Ev factor < 1 lux (rural area: the area of low light intensity - industrial areas or living areas in the country).