

1. Introduction.

This document reports on the levels of brightness in back lit illumination, comparing 6 sheet LED scrolling and Digital advertising panels.

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3. *Institute of Lighting Engineers (illuminated Advertisements).*

2. Luminance levels: The Institute of Lighting Engineers' Technical Report Number 5: Brightness of Illuminated Advertisements (2001) should be referred to if a proposed illuminated sign will be visible from the public highway. The following table is an extract from the report and provides the recommended maximum luminance levels in candelas per square metre (cd/m²), which can be calculated based on the size of the sign and its location:

Illuminated area (m ²)	Zone E1	Zone E2	Zone E3	Zone E4
Up to 10.00	100	600	800	1000
Over 10.00	n/a	300	600	600

E1 – Intrinsically dark areas (e.g. National Parks, Areas of Outstanding Natural Beauty or other dark landscapes)

E2 – Low district brightness areas (e.g. rural or small village locations)

E3 – Medium district brightness areas (e.g. small town centres, urban locations)

E4 – High district brightness areas (e.g. city and town centres with high levels of night time activity)

4. Light Meter Details

The results were taken on a Gossen Mavo-Spot 2 hand held light meter - As per image 1 below



Image 1

4.1 Applications

The MAVO-SPOT 2 is a high-precision measuring instrument with a measuring angle of 1°. Luminance measurements at distances of 1 meter to infinity can be performed with the instrument. The MAVO-SPOT 2 features mirror reflex optics with a 15° field of view, a sharply marked 1° measuring circle at the center and a focusing mechanism.

The close-up lenses available as accessories make it possible to shorten measuring distance to 34 cm. Luminance can be measured directly at displays with the help of the attachment for contact measurements.

The light sensitive sensor is colour corrected, that is its spectral sensitivity is matched to the spectral luminous efficiency of the human eye in daylight $V(\lambda)$. Classification of luminance meters is specified in DIN 5032, part 7, and in DIN EN 13032, appendix B. The MAVO-SPOT 2 fulfills class B requirements in accordance with these standards. The instrument is equipped with a measured value memory module with up to 1000 memory locations which can be read out and processed either directly via the keypad and display, or via the integrated USB port with the help of the included standard software.

Suitable for the measurement of, for example:

- Monitors in consideration of ambient light, for example approval and consistency testing in the field of medical technology in accordance with DIN 6868-57 and IEC 61223-2-5 (quality assurance guideline dated 20 Nov. 2003)
- Street, tunnel and airport illumination
- Illumination at sports facilities
- Contrast measurements at workstations (ASR)
- Illumination in museums and public buildings
- Projection screens (inspection for uniform illumination)

4.2 Test Results

The results were captured by pointing the light meter at 9 points across the face of the illuminated advertising panel, see example below (image 2), showing red and green squares.

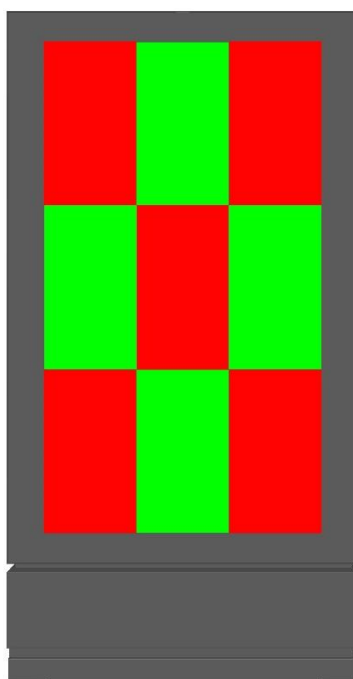


Image 2

Date: 31st January 2017 – readings taken between the hours of 17:00 - 23:00.

Readings taken using a Gossen, Mavo-Spot 2 light meter

Distance of 3 Meters

4.3 6 Sheet LED Scrolling advertising panel

Night Time Light Meter Readings
6 Sheet LED Scrolling Panels (JCD)
EDH5297AB – 04 Hanover Street, Edinburgh

Panel area readings cd/m^2

cd/m^2



50.7	77.4	55.8	Minimum	4.65
11.07	4.65	36.91	Maximum	68.3
7.0	14.68	68.3	Average	36.27



65.4	78.8	20.5	Minimum	5.8
8.2	5.8	21.4	Maximum	78.8
20.4	21.46	66.5	Average	34.27



2.2	3.14	2.9	Minimum	2.2
3.7	7.8	2.9	Maximum	12.6
2.4	12.6	2.5	Average	6.66

Date: 31st January 2017 – readings taken between the hours of 17:00 - 23:00.

Readings taken using a Gossen, Mavo-Spot 2 light meter

Distance of 3 Meters

Night Time Light Meter Readings
6 Sheet LED Scrolling Panels (JCD)
EDH5021AB – 03 Frederick Street, Edinburgh

	Panel area readings cd/m ²				cd/m ²
	77.9	65.5	87.2	Minimum	65.5
	95.1	126.8	93.4	Maximum	126.8
	81.0	98.2	100.2	Average	91.7
	10.6	14.5	28.9	Minimum	7.5
	13.2	10.1	14.0	Maximum	61.4
	44.6	61.4	7.5	Average	22.75
	3.6	4.5	5.1	Minimum	3.0
	3.9	7.5	3.6	Maximum	7.5
	4.0	4.7	3.0	Average	4.43

Date: 31st January 2017 – readings taken between the hours of 17:00 - 23:00.

Readings taken using a Gossen, Mavo-Spot 2 light meter

Distance of 3 Meters

Night Time Light Meter Readings
6 Sheet LED Scrolling Panels (JCD)
EDH5089AB – 03 Queens Ferry Street, Edinburgh

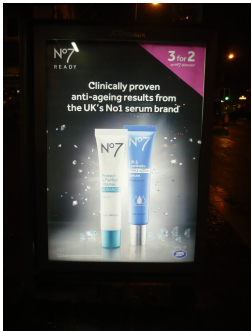
	Panel area readings cd/m ²				cd/m ²
	66.31	36.8	51.3	Minimum	14.4
	84.1	14.4	48.6	Maximum	84.1
	80.2	50.8	34.1	Average	51.84
	90.6	78.9	85.0	Minimum	22.0
	39.9	22.0	48.4	Maximum	106.3
	106.3	66.8	105.4	Average	71.47
	3.5	4.1	3.7	Minimum	2.3
	3.6	5.6	3.1	Maximum	5.6
	3.1	3.2	2.3	Average	3.57

Date: 31st January 2017 – readings taken between the hours of 17:00 - 23:00.

Readings taken using a Gossen, Mavo-Spot 2 light meter

Distance of 3 Meters

Night Time Light Meter Readings
6 Sheet LED Scrolling Panels (JCD)
EDH5025AB – 03 Lothian Road, Edinburgh

	Panel area readings cd/m ²				cd/m ²
	65.6	16.6	54.9	Minimum	16.6
	77.0	73.3	52.4	Maximum	77.0
	48.5	66.3	48.6	Average	55.9
	3.99	4.16	22.09	Minimum	3.99
	5.35	108.3	11.6	Maximum	108.3
	39.1	65.4	41.5	Average	33.49
	89.3	33.1	43.1	Minimum	21.1
	32.1	29.2	79.1	Maximum	89.3
	21.7	31.0	21.1	Average	42.18

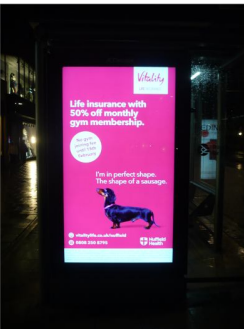
Date: 31st January 2017 – readings taken between the hours of 17:00 - 23:00.

Readings taken using a Gossen, Mavo-Spot 2 light meter

Distance of 3 Meters

4.4 6 Sheet 84" Digital advertising panel

Night Time Light Meter Readings
84" Single Digital Panels (MRI - Generation 9)
Princes St, Edinburgh, EDH8004AB – 01

	Panel area readings cd/m ²				cd/m ²
	98.7	100.4	106.1	Minimum	16.6
	129.1	134.6	126.2	Maximum	134.6
	19.7	16.6	51.9	Average	87.0
	9.6	53.8	52.1	Minimum	3.7
	10.6	67.5	11.1	Maximum	67.5
	44.6	17.3	3.7	Average	30.0
	53.7	52.8	25.4	Minimum	4.2
	19.7	45.8	52.7	Maximum	53.7
	50.8	4.2	48.9	Average	39.33

Date: 31st January 2017 – readings taken between the hours of 17:00 - 23:00.

Readings taken using a Gossen, Mavo-Spot 2 light meter

Distance of 3 Meters

Night Time Light Meter Readings
84" Single Digital Panels (MRI - Generation 9)
EDH8004AB- 04

	Panel area readings cd/m ²				cd/m ²
	244.7	194.9	87.4	Minimum	41.8
	250.4	157.1	224.9	Maximum	250.4
	196.2	127.3	41.8	Average	169.4
	62.84	54.2	265.1	Minimum	16.8
	52.3	53.1	51.2	Maximum	265.1
	54.7	16.8	51.6	Average	73.5
	9.9	19.9	82.8	Minimum	9.9
	99.4	16.4	18.4	Maximum	99.4
	51.2	57.6	20.8	Average	41.8

Date: 31st January 2017 – readings taken between the hours of 17:00 - 23:00.

Readings taken using a Gossen, Mavo-Spot 2 light meter

Distance of 3 Meters

Night Time Light Meter Readings
84" Single Digital Panels (MRI - Generation 9)
EDH8005AB-01

	Panel area readings cd/m ²				cd/m ²
	46.4	50.4	227.6	Minimum	11.7
	171.0	26.0	36.8	Maximum	227.6
	40.9	11.7	44.1	Average	72.7
	174.2	141.6	90.5	Minimum	25.7
	84.2	25.7	180.4	Maximum	180.4
	146.1	126.8	52.9	Average	113.6
	57.7	50.4	231.9	Minimum	9.3
	29.3	9.3	20.3	Maximum	231.9
	42.7	10.2	61.1	Average	56.9

Date: 31st January 2017 – readings taken between the hours of 17:00 - 23:00.

Readings taken using a Gossen, Mavo-Spot 2 light meter

Distance of 3 Meters

Night Time Light Meter Readings
84" Single Digital Panels (MRI - Generation 9)
EDH8007AB-04

	Panel area readings cd/m ²				cd/m ²
	8.8	234.0	46.7	Minimum	6.7
	53.8	6.7	58.2	Maximum	234.0
	47.1	54.6	8.8	Average	57.6
	142.0	80.8	60.2	Minimum	13.2
	54.9	13.2	18.7	Maximum	142.0
	17.2	27.5	13.25	Average	47.5
	256.1	171.3	97.1	Minimum	14.7
	223.5	26.0	220.2	Maximum	256.1
	158.9	114.4	14.7	Average	142.4

Date: 31st January 2017 – readings taken between the hours of 17:00 - 23:00.

Readings taken using a Gossen, Mavo-Spot 2 light meter

Distance of 3 Meters

5. Conclusion

The results recorded in this document were taken from JCDecaux street furniture, captured in the E4 zone; high district brightness areas, city and town centre.

The luminance results were taken from 9 target areas on the panel creative of the advertising panel (see image 1, page 4), please note: these results were taken with no pin point accuracy and will vary from site to site.

Note: there is always some variation of luminance over a panel creative even after several measurements have been made.

The difference associated with the problem of panel luminance may be appreciated by considering two identical panels in different settings, if one is placed in a well-lit shopping area it will appear to be considerably less bright than its counterpart in a dark country lane.

The luminance is the same for both signs but the contrast between the panel and its surroundings and therefore the brightness is quite different.

Readings will change between Light and Dark creatives considerably.

The results from this test concluded, that all sites and their panel creatives, on this occasion, were well below the recommended maximum luminance for the zone, and in accordance with the definitions in the institute of lighting engineers guidance notes for reduction of light pollution and CIE documents.