

# SONDE SQM - NOTICE D'UTILISATION

Abréviation :  
SQM : Sky Quality Meter



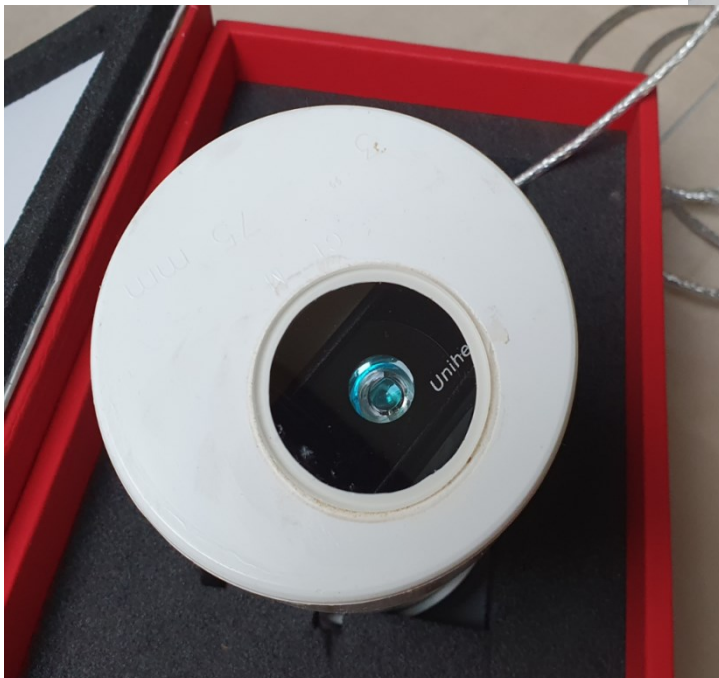
## 1. MATERIEL

Fabricant	Unihedron
Modèle	SQM-LU
Liaison	USB
USB S/N	FTCDNKBL
Site	<a href="http://www.unihedron.com/projects/sqm-lu/">http://www.unihedron.com/projects/sqm-lu/</a>
Manuel	<a href="http://www.unihedron.com/projects/darksky/cd/SQM-LU/SQM-LU_Users_manual.pdf">http://www.unihedron.com/projects/darksky/cd/SQM-LU/SQM-LU_Users_manual.pdf</a>

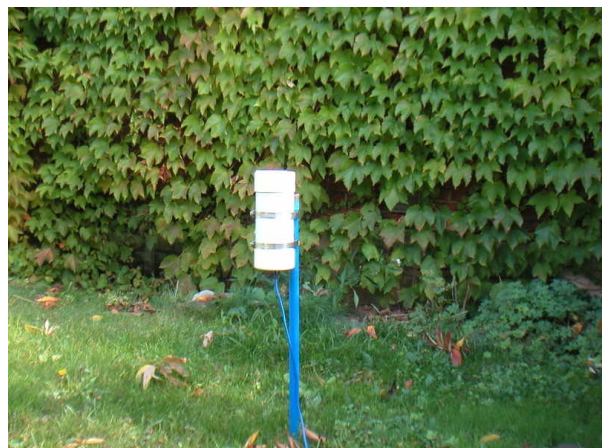


## 2. PHOTOS

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TUBE BLANC = Waterproofness housing



### 3. LOGICIEL

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A partir de ce lien :

<http://www.unihedron.com/projects/sqm-lu/>

Software Downloads:

- [Contents of CD including other language examples \(UDM, Perl, Python\)](#)
- [SQM Reader by Knightware](#)
- [MaxPilote](#) Supports SQM-LE, SQM-LU
- [APT \(Astro Photography Tool\)](#) Supports SQM-LE, SQM-LU
- [INDI Driver](#) for INDI clients such as Ekos or PixInsight
- [ASCOM Driver](#)
- [SQMroid](#): reads and logs SQM-LU data using an Android phone for a very small fee. Requires a USB OTG.

Unihedron Sky Quality Meter (SQM) products disk contents	
<a href="#">Live</a> <a href="#">Contact</a>	<p>Software and information for Unihedron products:</p> <ul style="list-style-type: none"><li>• <a href="#">SQM-LE</a></li><li>• <a href="#">SQM-LU</a></li><li>• <a href="#">SQM-LU-DL</a></li><li>• <a href="#">SQM-LU-DL-V</a></li><li>• <a href="#">SQM-LR</a></li></ul> <p>Unihedron Device manager (UDM):</p> <ul style="list-style-type: none"><li>• <a href="#">Windows</a></li><li>• <a href="#">Mac</a></li><li>• <a href="#">Linux</a></li><li>• <a href="#">Source</a></li></ul> <p>Reference material:</p> <ul style="list-style-type: none"><li>• Report on SQM by Pierantonio Cinzano <a href="#">sqmreport_v1p4.pdf</a></li><li>• Light sensor data sheet <a href="#">TSL237-E32.pdf</a></li><li>• IR Filter Hoya HCM500 Spectral response curves <a href="#">hcm500.htm</a></li></ul>

SQM-LU : USB connected Sky Quality Meter	
<a href="#">Home</a> <a href="#">Live</a> <a href="#">Contact</a>	Information and software
	<div>SQM-LU Users <a href="#">manual.pdf</a></div> <div><b>Operators manual</b><ul style="list-style-type: none"><li>This manual contains the setup instructions for the unit as well as the communication protocol definition.</li></ul></div>
	<div>UDM for Windows:<ul style="list-style-type: none"><li>Run <b>setup file</b> to install properly in Windows.</li></ul></div> <div>UDM for Linux:<ul style="list-style-type: none"><li>Install <a href="#">Debian file</a>.</li></ul></div> <div>UDM for Mac OS X<ul style="list-style-type: none"><li>Open <a href="#">dmg file</a>.</li><li>Then drag app to the /Applications directory.</li></ul></div> <div>UDM: <a href="#">source code</a> Programming language: <a href="#">Lazarus/FreePascal</a></div>
	<div><b>Unihedron Device Manager (UDM)</b></div> <div>Use this software to:<ul style="list-style-type: none"><li>Access the data-logging features of the SQM device attached to your computer.</li><li>Read version information.</li><li>Request a reading from the SQM.</li><li>Read and set calibration data.</li><li>Read and change the interval reporting settings.</li><li>Install new firmware.</li></ul></div> <div>The operating instructions for UDM are included in the User's manual for the meter.</div>
	<div><b>Windows USB driver</b> <a href="#">Mac OS X USB driver</a></div> <div><b>USB driver</b><ul style="list-style-type: none"><li>The latest USB drivers can be found at <a href="#">FTDichip</a></li><li>Recent Linux distributions come with the FTDI VCP driver installed.</li></ul></div>
	<div><a href="#">Firmware files</a></div> <div><b>Firmware updates</b><ul style="list-style-type: none"><li>These firmware files are to be used by UDM (see above).</li><li>See the operators manual for firmware revision history.</li></ul></div>
	<div><b>Sqm3Setup.exe</b></div> <div><b>SQM-Reader by Knightware</b><ul style="list-style-type: none"><li>Windows software by Knightware to read SQM-LE/LU/LR/DL devices.</li><li>Check <a href="#">www.knightware.biz</a> for latest version as well as SQM-Reader-Pro which has many more features.</li></ul></div>

a) Installer les pilotes USB :  
*CDM v2.12.00 WHQL Certified.exe*

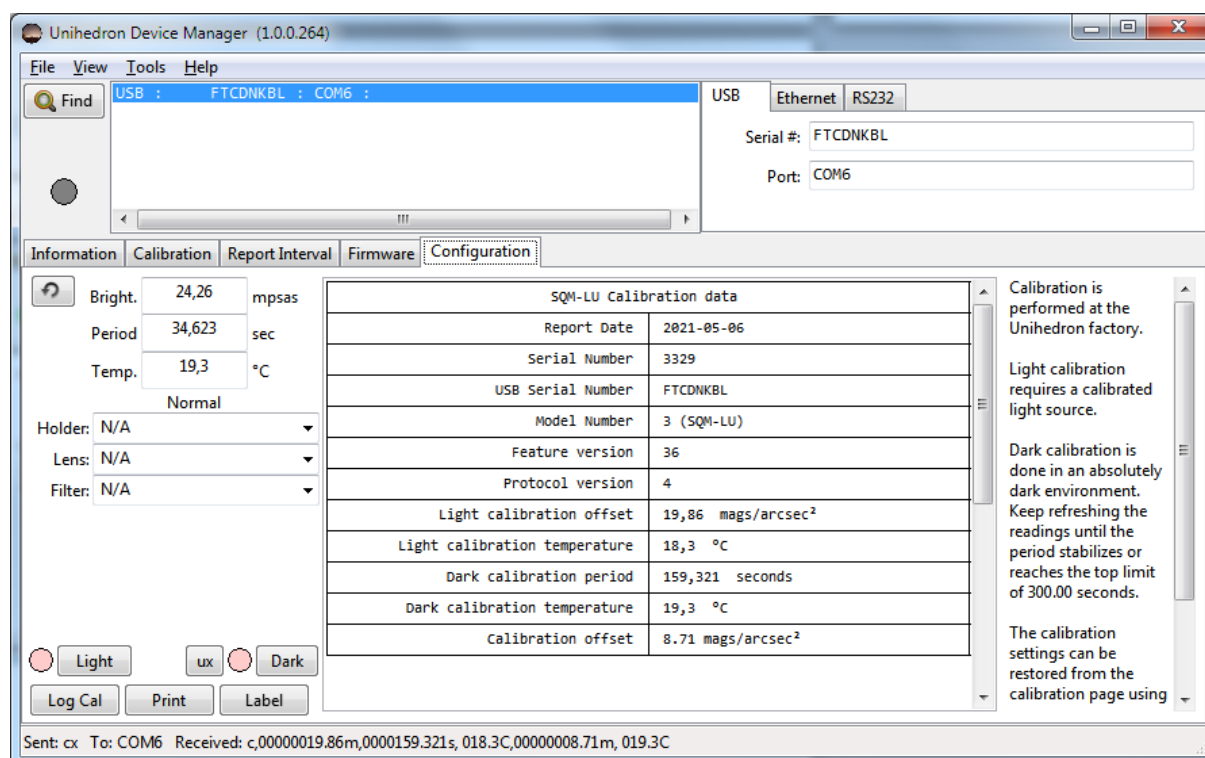
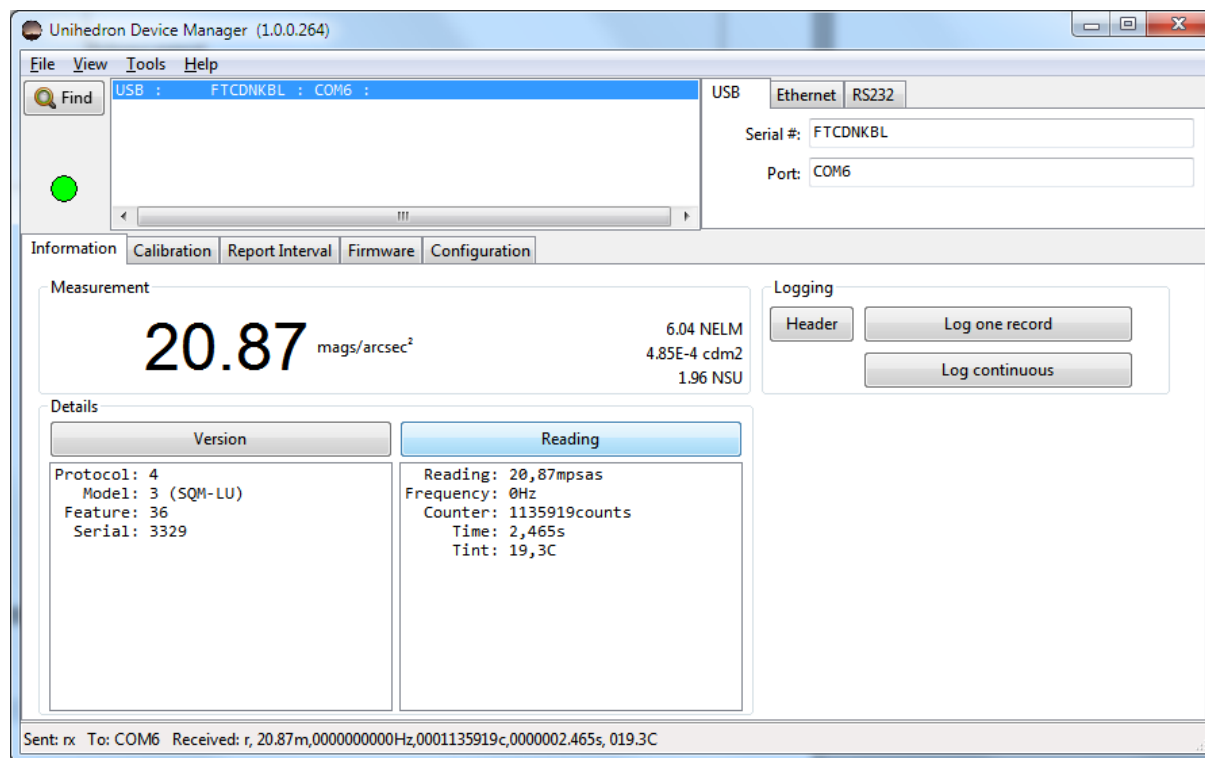
b) Installer :  
 UDM (Unihedron Device Manager)  
*setup UDM 1.0.0.264.exe*

OU

SQM-Reader by Knightware  
*Sqm3Setup.exe*

### 3.1 Unihedron Device Manager

Pour faire une mesure manuelle, il suffit de cliquer sur « Reading ».  
Possibilité de logger les mesures à intervalle régulier.





### 3.2 SQM-Reader by Knightware

Interface très épurée.

**SQM Reader 3**

SQM Model: LU (USB) | IP Address: (null) | TCP Port Number: 10001 | COM Port: COM6

Read Now | Reget | Read Every | Minutes: 1 | Timeout (seconds): 1

☐ Save readings to: [ ]

Reading in Mag/Sq Arcsec: **19.47** | NELM (Theoretical): **5.1**

Time of Reading: **06/05/2021 22:41:19**

Model: 3 | Serial Number: 3329 | Protocol Version: 4 | Feature Version: 36 | Temp at Sensor (°C): 19.3 °C

Style: Slate Classico | **SQM Reader by Knightware** | Visit [knightware.biz](http://knightware.biz)

Copyright © 2008-2017 Knightware, LLC. | Version 3.0.0.0

## 4. RESULTATS

The SQM-LU provides readings in Magnitudes per square arcsecond, abbreviated as: mpsas, and written mathematically as  $\frac{mag}{arcsec^2}$ .

Mpsas is a logarithmic measurement which means that large changes in sky brightness correspond to relatively small numerical changes. A difference of 5 magnitudes is a factor of 100 times the intensity. Therefore a sky brightness  $5.0 \frac{mag}{arcsec^2}$  darker corresponds to a reduction in photon arrival rate of a factor of 100.

The following schematic gives a rough idea of how to interpret the readings of the SQM:

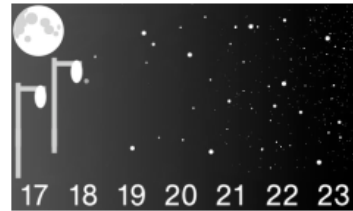


Figure 2.1: Mpsas interpretive scale

**Magnitudes** are an astronomical unit of measure for object brightness. Brighter objects have a lower magnitude and darker objects have a higher magnitude value. For example; a star that is 6th magnitude is brighter than a star that is 11th magnitude.

The star Vega is used as the reference point of  $\approx 0$  magnitude. Table 2.1 shows the apparent magnitude of some common known celestial objects.

Table 2.1: Apparent Magnitudes of Known Celestial Objects adapted from [2]

App. Mag.	Celestial Object
-26.73	Sun
-12.6	full Moon
-4.7	Maximum brightness of Venus
+0.03	Vega, the original zero point
+6	Faintest stars observable with naked eye
+27	Faintest objects observable in visible light with 8m ground-based telescopes
+30	Faintest objects observable in visible light with Hubble Space Telescope

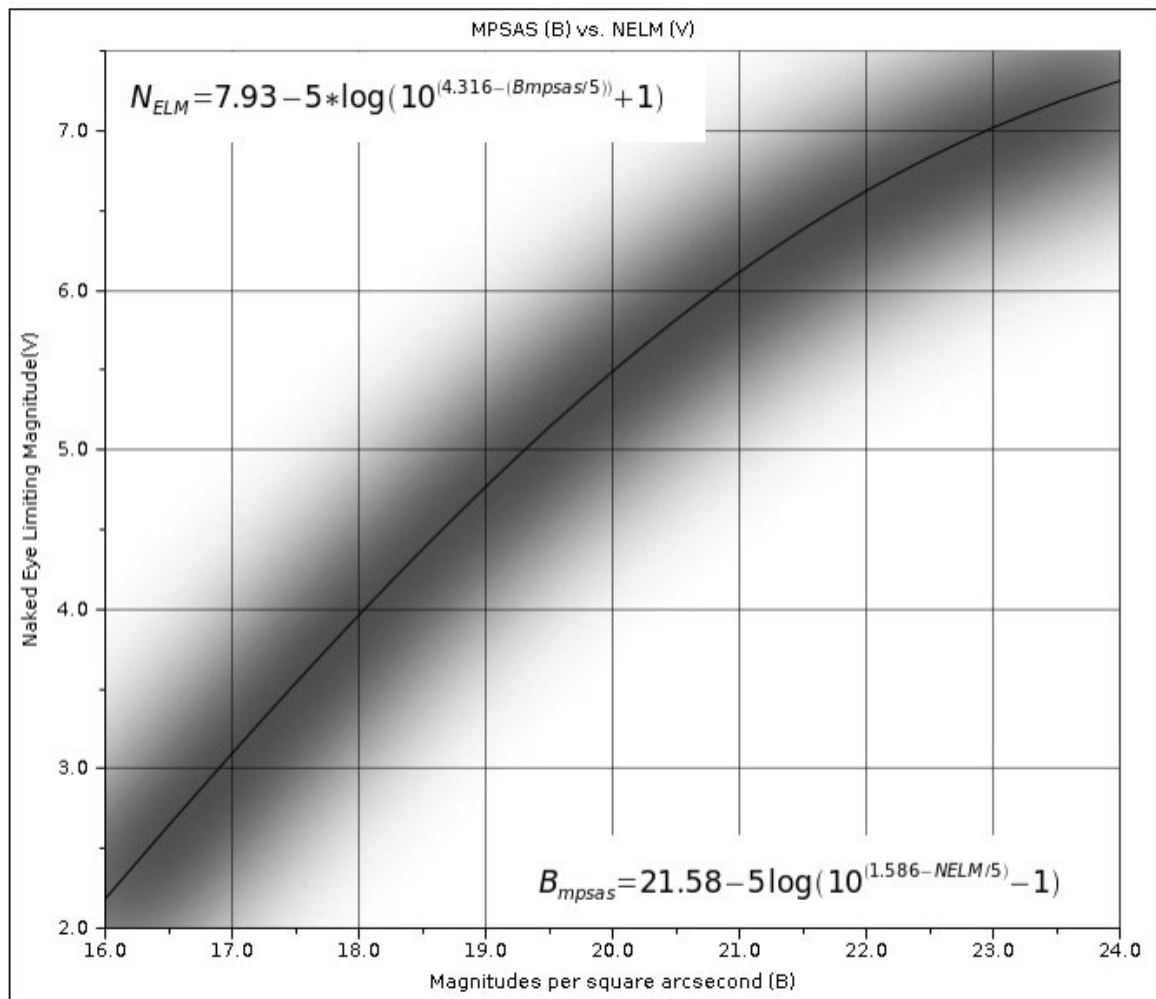


Figure 2.2: Mpsas vs NELM

Ce graphique montre quelle est la magnitude des plus faibles étoiles observables à l'œil nu, en fonction du résultat donné par la sonde SQM.

*Exemple : pour un SQM de 20.8, on pourra observer à l'œil nu des étoiles allant jusqu'à magnitude 6.*