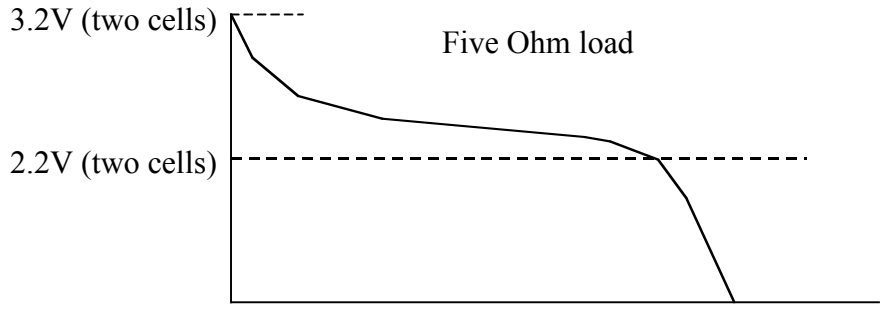
FT Opto Laboratories

Client	Test Report No	Date
Eflare Corporation Pty Ltd 222 St Kilda Rd St Kilda Vic Australia	051110	11 October 2005

Note on Estimating of Battery Life

Battery Manufacturers Give battery discharge characteristics with a constant resistive load, like Figure One

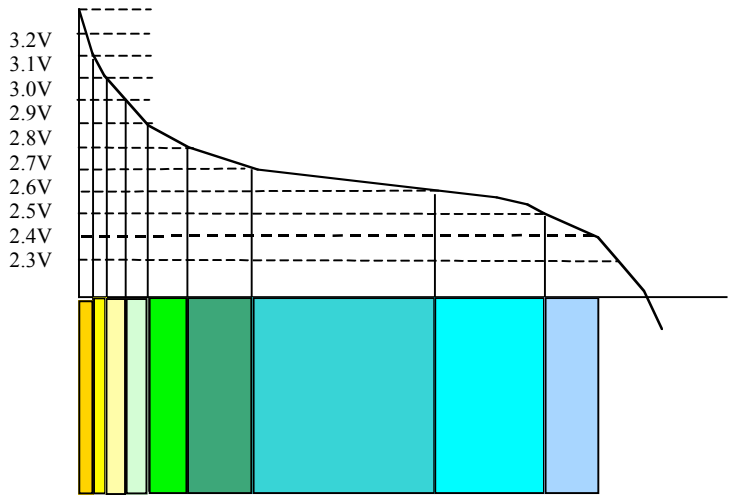
Figure One Typical Battery Discharge Characteristic



The Eflare is designed to deliver a near-constant brightness, so its effective load resistance changes in time. As the battery is discharged, the resistance lowers in order to take more current.

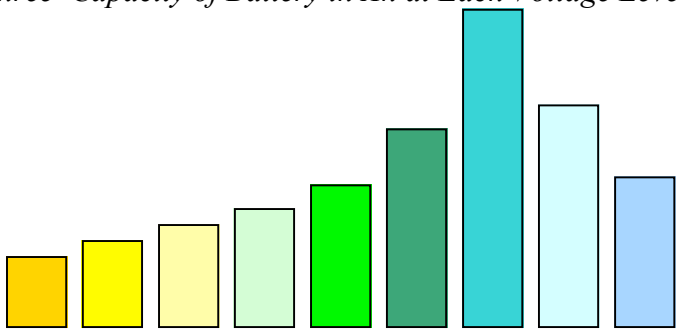
In order to estimate the Eflare's battery life, we must first calculate the battery's capacity at each part of its life. The life is divided up into levels of battery voltage, each one covering a 0.1V range.

Figure Two Estimate of Hours Spent at Each Voltage Level



Then the capacity available at each voltage level is calculated.

Figure Three Capacity of Battery in Ah at Each Voltage Level



3.1V 3.0V 2.9V 2.8V 2.7V 2.6V 2.5V 2.4V 2.3V

Figure three shows how the battery may spend much of its operating life at intermediate voltages 2.4 to 2.7V.

Figure Four shows the current drawn by the Eflare at different voltages. Note that initially the current **increases** as the voltage falls *. This allows the Eflare to maintain constant brightness at lower battery voltage. Below around 2.4V this cannot be sustained and the brightness starts to drop. Below this point the low battery indicator is active.

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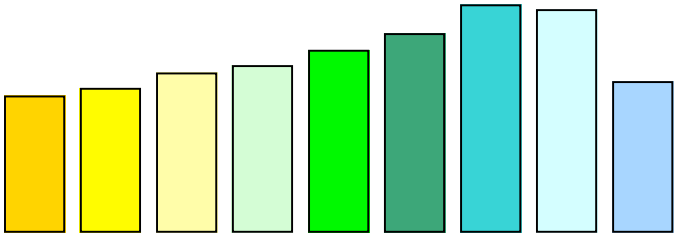
Figure Four Current Draw by Eflare



3.1V 3.0V 2.9V 2.8V 2.7V 2.6V 2.5V 2.4V 2.3V

To estimate the battery life, the figures in figure 3 (capacity) are divided by the figures in figure four (current draw) and accumulated.

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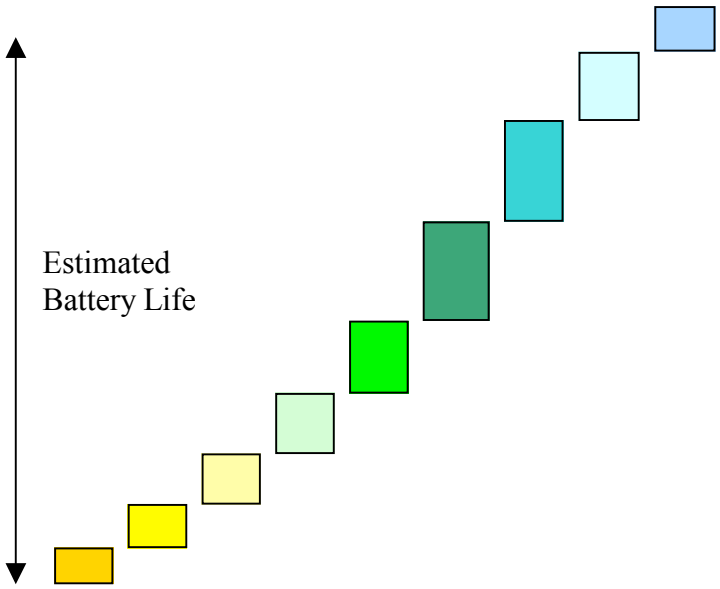
Figure Five Accumulation of Hours of Service at Each Voltage Level



3.1V 3.0V 2.9V 2.8V 2.7V 2.6V 2.5V 2.4V 2.3V

For products with very heavy current draw the battery internal resistance (typically 0.3ohm for two cells) will play an important part. The effective battery voltage is reduced and the low battery indicator will be active sooner than found in the above calculation. Low temperatures also increase the battery resistance, and batteries near end of service have higher internal resistance also.

Battery life values are 40 hours minimum for EF510, EF520 and EF530.

* Some models pre 2006 do not show the increase in current

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