

# Comparison of Communications Equipment Power Consumption

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*Polar Technology Conference*

*Menlo Park, California*

*26 & 27 April 2007*

# Website on Power Systems for Polar Deployment



> [Home](#)

## OBJECTIVE

**PolarPower.org** is funded by the [National Science Foundation](#) with the goal of providing a useful working resource for researchers in choosing, designing, implementing, and maintaining remote power systems in polar environments. This site allows the polar research community to establish a foundation of knowledge, share experiences, and stay current on technological developments.









## TECHNOLOGIES FOR REMOTE POWER APPLICATIONS

This section offers basic information regarding the various technologies available for remote power systems and their applicability for both small and large implementations, as well as practical information regarding choosing, designing, and implementing them.

The content draws on the design and field experiences of both VPR's team of experts and the polar research community. This information is presented as white papers, product reviews, and (in the future) engineering calculators.

The basic technology sections are:

### Icon Definition

-  **Engine** - Internal combustion engines are a proven technology used worldwide. A wide selection of fuels are usable, depending on the application. [link](#)
-  **Fuel Cell** - A fuel cell is an electrochemical device that combines hydrogen and oxygen to produce electricity. The process is clean, quiet, and efficient. A byproduct of the process is water, however, which can be a problem for deployments in a polar environment. The technology is still in its infancy, but commercial products are becoming available. [link](#)
-  **Hydroelectric** - Small scale turbines can provide a source of electricity at sites where water can be found in a liquid state for at least part of the year. [link](#)
-  **Solar Electric (Photovoltaic)** - Cells made up from two or more layers of semiconductor material can produce electric power when excited by photons. The sun is a major source for such photons, but the process also works for other sources of light. Cells may be stacked into arrays to meet different voltage and power requirements. [link](#)
-  **Storage** - Primary and rechargable batteries are often used as a site's sole source of power or in conjunction with one or more of the available power generation technologies to provide a reservoir of continuous power to the load. Flywheels and ultracapacitors are new technologies that are finding their way as a replacement for rechargable batteries. [link](#)
-  **Wind** - Wind-powered turbines are a clean source of power. Special problems arise with a moving mechanical device in polar regions prone to ice formation and high wind velocities. Mounting structures also provide challenges for systems that may be located on ice fields well above solid ground. [link](#)

# *Iridium Transceivers*

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**9505**



**A3LA-D**



## Inmarsat BGAN – Nera WorldPro 1000/1010



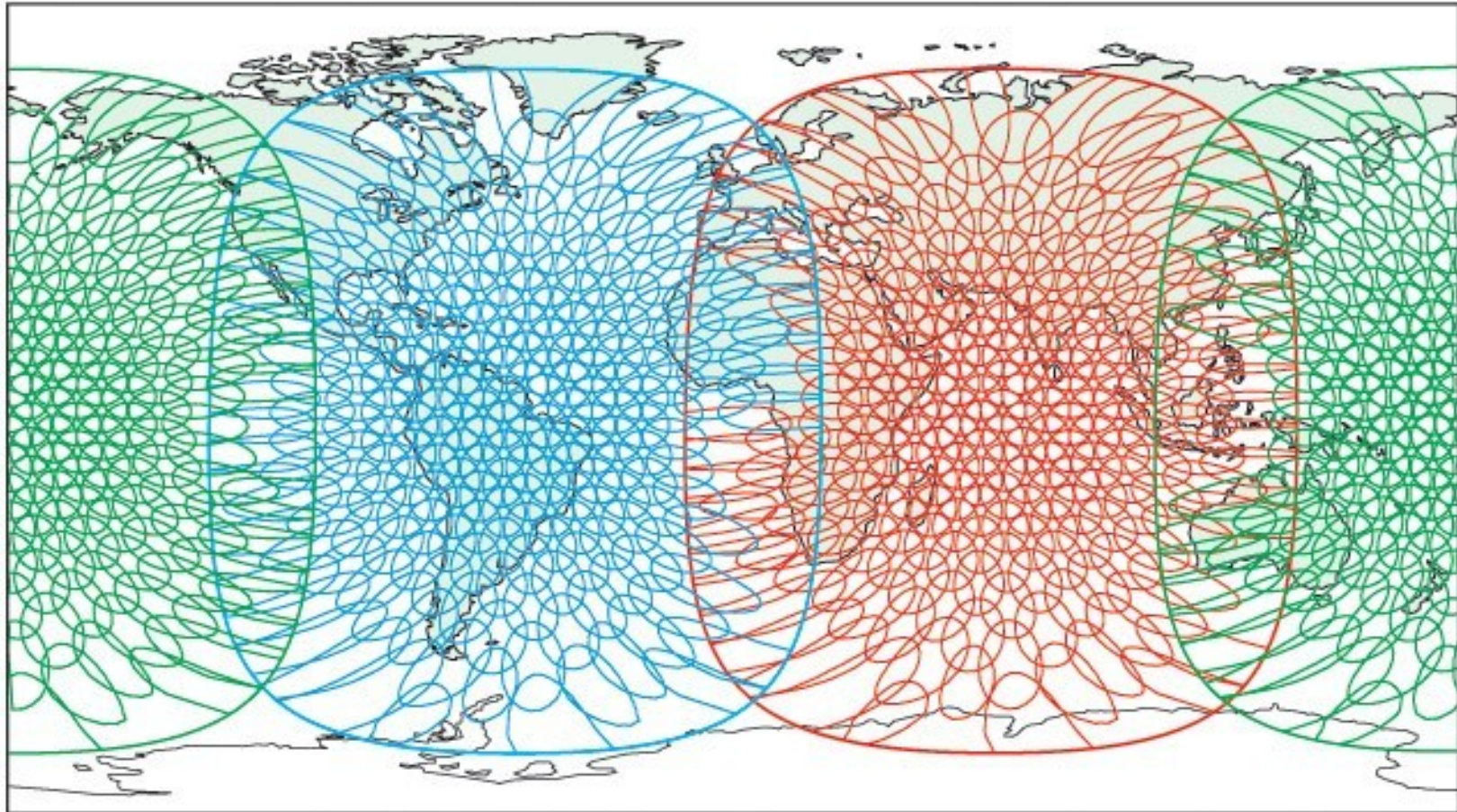
- ❑ **Good data rates for background Internet service**
  - 60 kbps uplink
  - 120 kbps downlink
  
- ❑ **Cost effective**
  - \$2,800 purchase cost
  - \$35/month
  - \$0.90/minute voice
  - \$6.47/MB data  
(1/10<sup>th</sup> cost of Iridium)
  
- ❑ **Tested with PC and Mac**
  
- ❑ **Nera needs manual intervention. Hughes and Thrane & Thrane do not.**

## Nera WorldPro 1000/1010 Features

- ❑ Rugged. Specified for cold climates (-20° to + 55° C)
- ❑ Separable antenna unit. 3-, 10- or 20-meter interconnecting cable option.
- ❑ 5 hr Transmit on internal battery. Runs from 12-V ext. battery.
- ❑ Standby mode for “always on” connectivity
- ❑ Interface: USB (1000), USB & Ethernet (1010)



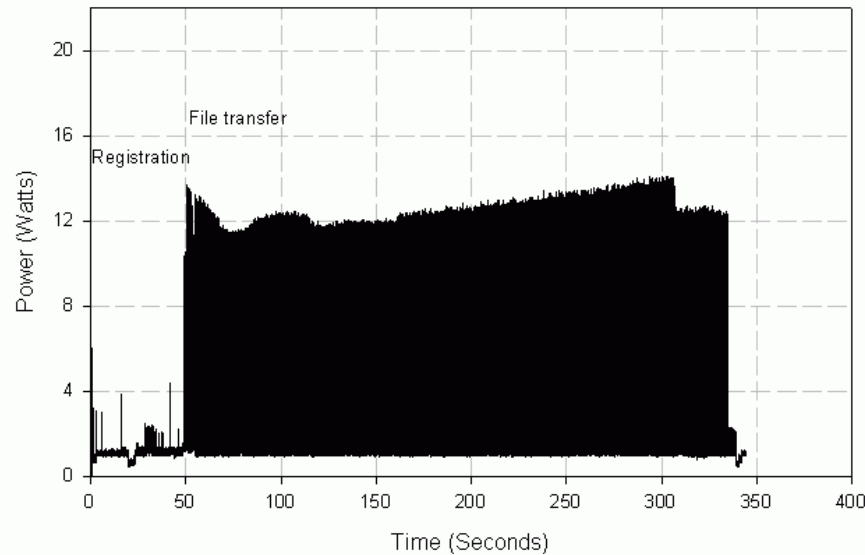
## Inmarsat BGAN Coverage – Spot Beams



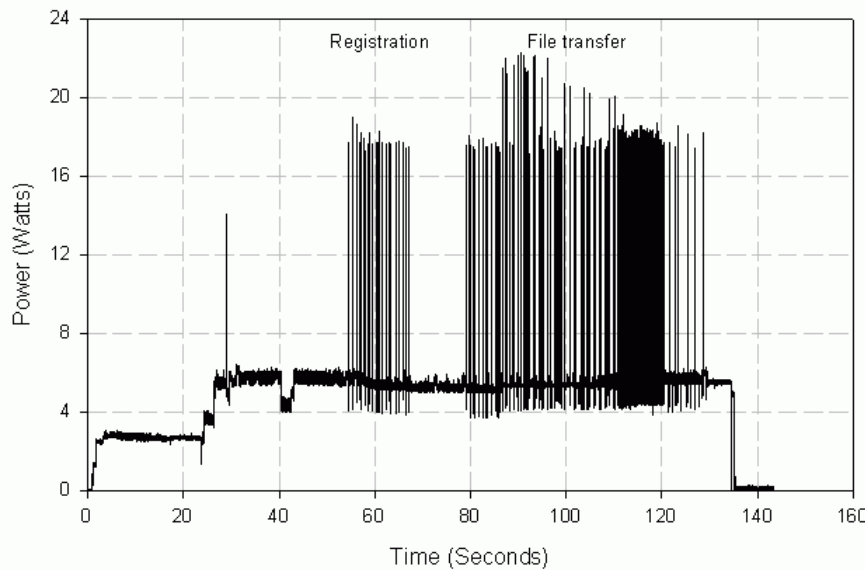
- F1 Inmarsat-4 64°E
- F2 Inmarsat-4 53°W
- F3 Inmarsat-4 178°E

The map depicts Inmarsat's expectations of coverage but does not represent a guarantee of service. The availability of service at the edge of coverage areas fluctuate depending upon a variety of conditions. The launch of the F-3 satellite will be determined in due course.

## Power Consumption – 103 kB file transfer



**Iridium 9505**  
**0.461 W-hr**



**Nera WorldPro 1000**  
**0.214 W-hr**

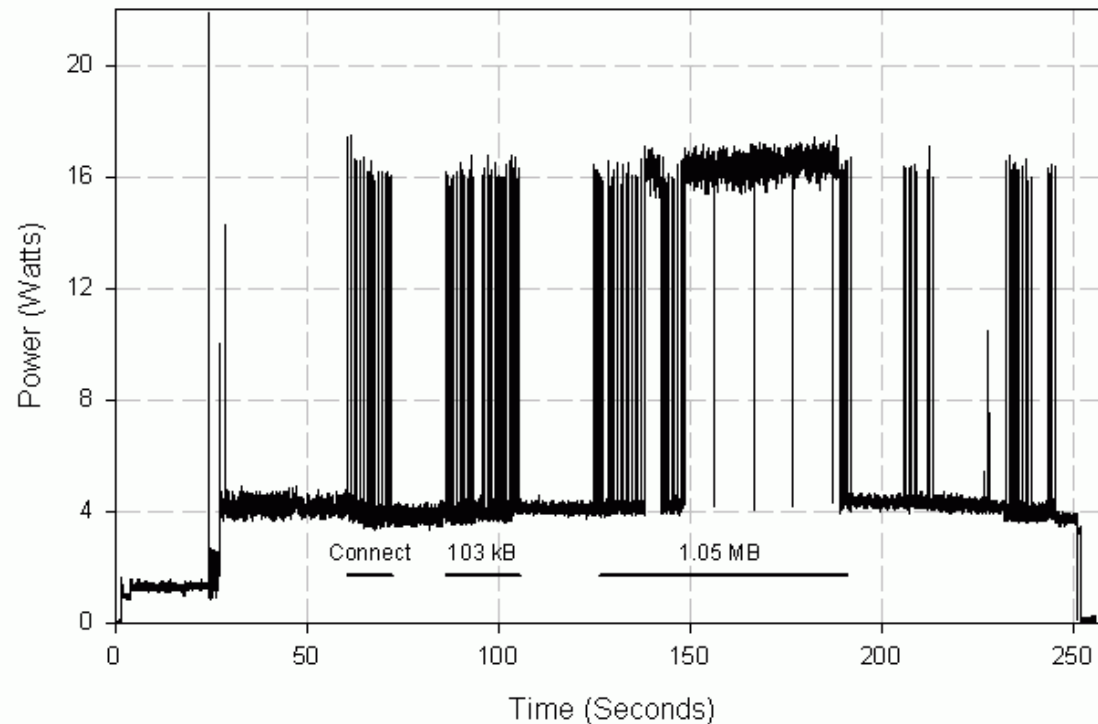
## Power Consumption – 0.103 & 1.03 MB file transfers

### Iridium 9505

**5.2 W-hr (estimated)**  
**65 minutes (estimated)**  
**\$78 commercial rate**

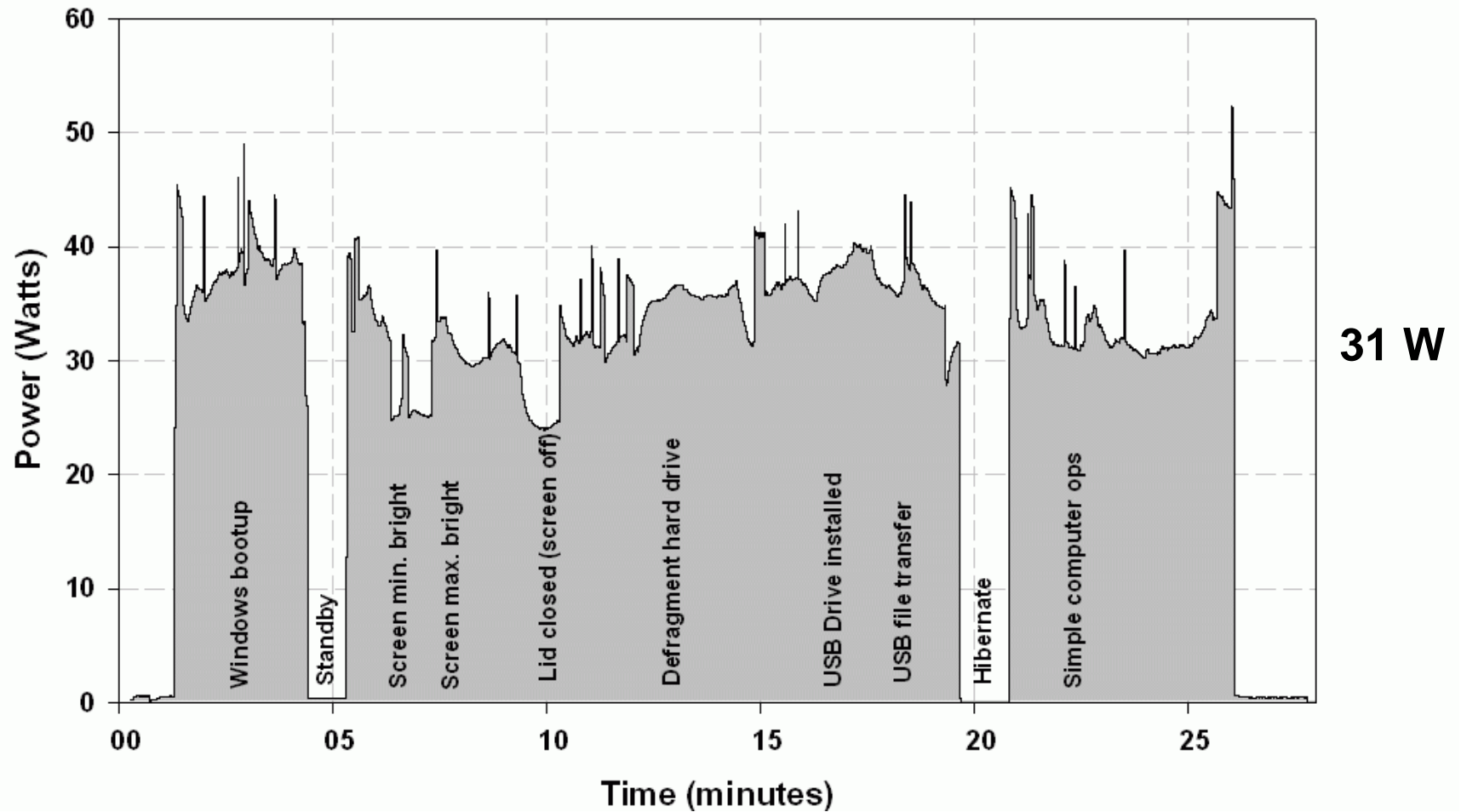
### Nera WorldPro 1000

**0.431 W-hr**  
**4.2 minutes**  
**\$7.50 commercial rate**

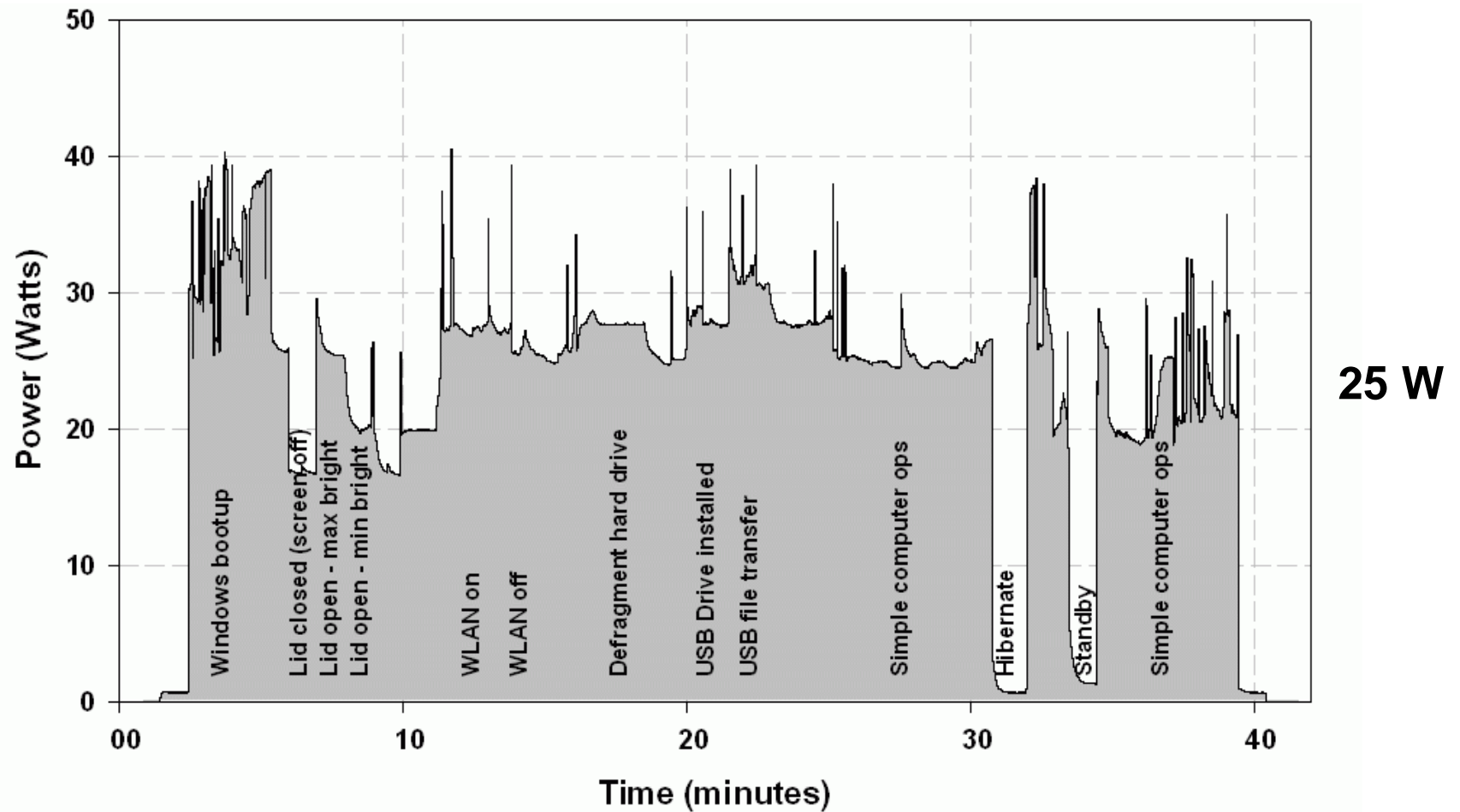




# Power Consumption – Lenovo T60p



# Power Consumption – Lenovo T40p



# Power Consumption – Panasonic CF-30 Toughbook

