



COMMISSION REGULATIONS ErP Technical Documentation

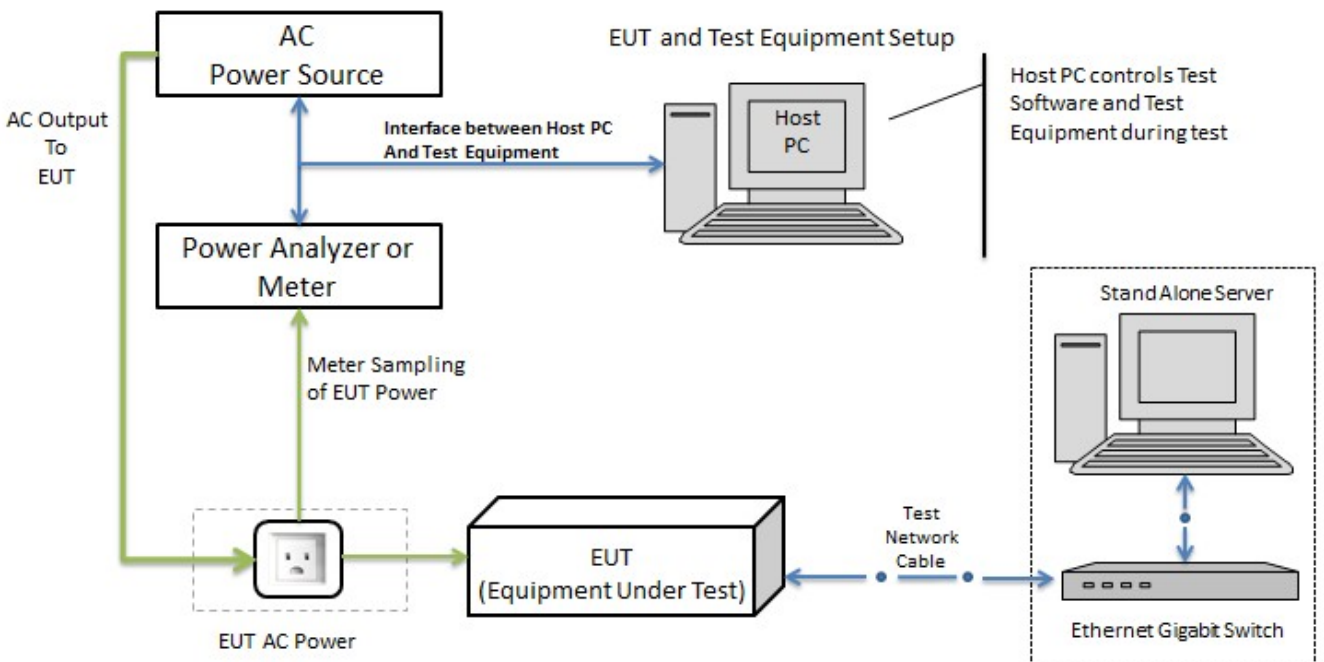
COMMISSION REGULATION 617/2013 (ErP Lot 3)

Test parameters for measurements:

- Computer energy consumption is tested at 230 Volts / 50 Hz.
- Total harmonic distortion of the electricity supply system,

Supply Voltage:	Europe	230 ($\pm 1\%$) Volts AC, 50 Hz ($\pm 1\%$)
	Note: For products rated for > 1.5kW Maximum power, the volt range is $\pm 4\%$.	
Total Harmonic Distortion (THD) (Voltage):	< 2% THD (<5% for products which are rated for > 1.5kW maximum power).	
Ambient Temperature:	23° C \pm 5° C	
Relative Humidity:	10 – 80 %	
Air Flow	< 0.5 m/s (meters/second)	

Information and documentation on the instrumentation, set-up and circuits used for electrical testing:





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Term or Acronym	Definition
EUT (UUT)	Equipment Under Test (or Unit Under Test)
E_{TEC}	'Annual total energy consumption (E_{TEC})' is the electricity consumed by a product over specified periods of time across defined power modes and states
E_{TEC} - Desktops	$= (8760/1000) * (0.55*P_{off} + 0.05*P_{sleep} + 0.40*P_{idle}).$ For computers that lack a discrete sleep mode, but have idle state power demand less than or equal to 10.00 W, power in idle state (P_{idle}) may be used in place of sleep (P_{sleep}) in the above equation, such that the formula is replaced by: $E_{TEC} = (8760/1000) * (0.55*P_{off} + 0.45*P_{idle})$
E_{TEC} - Notebooks	$E_{TEC} = (8760/1000) * (0.60*P_{off} + 0.10*P_{sleep} + 0.30*P_{idle})$
Watts	All P_x are power values in the indicated mode/state as defined in the definition section, measured in Watts (W) according to the procedures.
Idle Mode Testing	Unit Under Test (UUT) shall be allowed no more than 20 minutes from the point of ceased user input before measurements must be recorded.
Additional Internal Storage	Means any and all internal storage devices, including hard disk drives (HDD), solid state drives (SSD) and hybrid hard drives (HHD), included within a computer beyond the first
Television tuner	Means a discrete internal component that allows a computer to receive television signals;
Audio card (sound card)	Means a discrete internal component that processes input and output audio signals to and from a computer
Wake event'	Means a user, scheduled, or external event or stimulus that causes the computer to transition from sleep mode or off mode to an active mode of operation. Wake event includes, but is not limited to, the following events: movement of the mouse; keyboard activity; controller input; real-time clock event; a button press on the chassis; and in the case of external events, stimulus conveyed via a remote control, network or modem;
Wake On LAN (WOL)	Means a functionality which allows a computer to transition from sleep mode or off mode (or another similar low power mode) when directed by a network request via Ethernet;
Internal Power Supply	Dell's Internal Power Supplies (IPS) have been tested and qualified by ECOVA to 80 PLUS standards which includes certification ranges from Bronze, Silver, Gold, Platinum, and Titanium based upon Energy Efficiency and Power Factor. Dell's Environmental Data Sheets contain links to the specific reports for each platform.
External Power Supply	Dell's Environmental Data Sheets contains links to efficiency and no-load reports for each External Power Supply as publically reported on the Natural Resources Canada (NRCan) website.



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Test Mode Measurements	
Measurements	For the purposes of compliance and verification of compliance with the applicable requirements of this Regulation, measurements and calculations are made using COMMISSION-REGULATION-617-2013-Transitional-methods & EN 62623:2013.
	Place EUT (UUT) into the Mode to be tested, and allow for stabilization period before measurement:
Idle Mode ¹	The power state in which the operating system and other software have completed loading, a user profile has been created, activity is limited to those basic applications that the system starts by default, and the computer is not in Sleep Mode. Idle State is composed of two sub-states: Short Idle and Long Idle.
Long Idle	The mode where the Computer has reached an Idle condition (i.e., 15 minutes after OS boot or after completing an active workload or after resuming from Sleep Mode) and the main Computer Display has entered a low-power state where screen contents cannot be observed (i.e., backlight has been turned off) but remains in the working mode (ACPI G0/S0). If power management features are enabled as-shipped in the scenario described in this definition, such features shall engage prior to evaluation of Long Idle (e.g., display is in a low power state, HDD may have spun-down), but the Computer is prevented from entering Sleep Mode. For ErP Lot 3, this applies to Computers with an integrated display.
Short Idle:	The mode where the Computer has reached an Idle condition (i.e., 5 minutes after OS boot or after completing an active workload or after resuming from Sleep Mode), the screen is on, and Long Idle power management features have not engaged (HDD is spinning & Computer is prevented from entering sleep mode). For ErP Lot 3, this applies to Computers without an integrated display.
Sleep Mode	Sleep Mode: Means a low power mode that a computer is capable of Entering automatically after a period of inactivity or by manual selection. In this mode the computer will respond to a wake event. Where Advanced Configuration and Power Interface (ACPI) standards are applicable, Sleep mode usually correlates to ACPI system level G1/S3 (suspend to RAM) state
Standby/Off Mode	Means the power demand level in the low power mode which cannot be switched off (influenced) by a user, other than through the movement of a mechanical switch, and which may persist for an indefinite period of time when the appliance is connected to the main electricity supply and used in accordance with the manufacturer's instructions. Where Advanced Configuration and Power Interface (ACPI) standards are applicable, off mode usually correlates to ACPI system level G2/S5 ('soft off') state
Lowest Power State	State or mode with the lowest power demand found in a computer. This state or mode may be entered or left by either a mechanical means (e.g. by turning off the computer's power through the movement of a mechanical switch) or via automatic means. (Same as Off mode with WOL "Off").
Network connection	The EUT (UUT) must be connected to an Ethernet network switch capable of the EUT highest and lowest network speeds. The network connection must be live during all tests.
Battery Removal	Notebooks and Tablets either have the battery packs removed for all tests or ensure the batteries are fully charged.
Wireless Settings	Power to wireless radios should be turned off for all tests. This applies to wireless network adapters (e.g. 802.11) or device-to-device wireless protocols.

¹ As Defined by EPA ENERGY STAR 6.1 Computer Specification



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Power Management

System power-management features save energy by allowing computers to enter low power modes when not in use for a specified period of time. These power-management features are activated on all computers.

The power-management features are preset to allow the computer to transition from **Idle Mode**, to **Monitor Sleep Mode**, then **Computer Sleep Mode** after the following periods of inactivity:

Product Type	Operating System	Monitor/Display	Computer
Desktop, All-In-Ones, Thin Clients, Workstations, Mobile Workstations, and Notebooks	Microsoft Windows 7, 8, 8.1, 10, ThinOS, and ThinLinux	5-10 minutes	15-30 minutes (except certain Thin Clients)
	Microsoft Windows with Tobii	1 minute	3 minutes
	Ubuntu	10 minutes	30 minutes
	Chrome	8 minutes	30 minutes

The computer and monitor can be woken from the sleep state through user interaction with the keyboard or mouse. Regulation (EU) No 617/2013 requires the latency to be ≤ 5 seconds.

Product Type	Operating System	Monitor/Display	Tablet
Tablets / Slates	Microsoft Windows 8, 8.1, and 10	10 minutes	10 – 30 minutes
	Android	10 minutes	10 minutes

Tablets / Slates can be woken from sleep state through user interaction with the power button.

Wake on LAN (WOL)

Computers configured with WOL can also be woken from the sleep state by a network signal. Wake-up from sleep state is unaffected by the BIOS setting and must be enabled or disabled in the operating system. WOL works only when the computer is connected to an AC power supply and may differ based on chassis or platform.

The speed of any active 1Gb/s Ethernet network link is reduced when transitioning to sleep or off state.

Wake Management

Computers with Ethernet capability that are shipped through enterprise channels (sales channels typically used by large and medium-sized business, government, educational, or other organizations to purchase computers for use in managed client or server environments) are capable of both remote (via network) and scheduled (via real-time clock) wake events from sleep state.

Power Management energy-saving potential: www.energystar.gov/powermanagement

You can help reduce electricity usage and its side effects by leaving the power-management features enabled and by turning off your product when it is not in use for extended periods of time.

Notebook & Tablet Batteries

Minimum number of loading cycles that the batteries can withstand:

All currently shipping Dell Notebook & Tablet batteries meet the **Endurance in cycles at a rate of 0,5 I_t, A (accelerated test procedure)** as defined in **section 7.6.3 of the IEC EN 61960 Edition 2.0 2011-06**. The test procedure requires that Cells are taken through **400 cycles** and the remaining capacity when the test is completed shall meet the acceptance criteria of **60%** as stated in **Table 5** of the standard.



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Dell Desktop Internal Power Supplies

Model Number	Efficiency, 230V/50HZ				Power Factor @ 100% Load
	10% Load	20% Load	50% Load	100% Load	
D180EA-00	83.26	88.66	91.83	90.42	0.96
D185EA-00	83.09	89.24	92.50	91.32	0.97
D260EA-00	83.78	89.88	91.76	89.89	0.98
D300EM-01	81.22	85.77	87.41	85.26	0.99
D200EA-00	84.58	90.04	92.45	90.47	0.97
D250ED-01	80.01	88.23	91.35	89.29	0.97
D255ES-00	86.08	90.00	91.31	89.92	0.98
D275EM-00	83.43	88.86	91.43	90.29	0.98
D290EM-00	80.86	88.03	91.58	90.20	0.97
D315ES-00	83.65	89.90	91.67	90.27	0.96
D330EA-00	85.41	90.45	92.52	91.51	0.98
D365EM-00	85.11	90.34	92.10	89.98	0.97
D850EF-00	84.29	88.42	88.89	84.71	0.98
D1300EF-01	83.58	91.22	92.92	90.83	0.99
D1300EF-02	80.74	89.28	91.64	89.36	0.99
D425EF-00	88.97	91.12	92.47	90.58	0.95
D425EF-02	86.16	90.91	92.55	91.00	0.96
D635EF-00	79.96	88.91	92.01	90.83	0.97
D685EF-00	80.00	88.70	91.77	90.04	0.97
D685EF-01	86.27	91.54	93.11	91.27	0.95
D825EF-00	81.57	89.64	92.58	91.28	0.96
D825EF-01	81.16	89.71	92.62	91.56	0.95
L275EM-00	83.06	89.35	91.35	89.61	0.98
L250ED-00	82.50	88.76	91.49	88.48	0.98
L200EU-00	83.20	87.96	90.92	89.23	0.98
L200EU-01	83.50	87.93	90.96	89.40	0.98
L255ES-00	79.35	88.52	91.49	88.67	0.99
L255ES-01	79.73	85.19	87.04	84.47	0.99
L290EM-00	83.72	89.19	91.67	89.37	0.99
L290EM-01	79.44	85.61	87.73	85.76	0.99
L200EA-01	83.34	89.82	90.89	88.17	0.98
L260EA-00	83.24	88.74	91.73	88.99	0.98
L330EA-00	85.70	90.70	91.75	89.77	0.99



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Model Number	Efficiency, 230V/50HZ				Power Factor @ 100% Load
	10% Load	20% Load	50% Load	100% Load	
H250ED-00	83.87	87.62	91.43	89.57	0.984
H240ES-01	82.02	88.63	91.37	89.62	0.983
H255ES-00	83.76	89.80	91.69	89.81	0.980
H290EM-00	83.85	89.09	91.84	90.38	0.983
H315ES-00	84.26	89.57	91.93	89.98	0.974
H825EF-01	85.28	90.26	92.15	91.10	0.962
H1300EF-01	85.34	90.49	92.22	90.57	0.975
H685EF-00	83.36	88.98	91.52	90.63	0.969
H825EF-02	85.13	90.24	92.68	91.04	0.962
H1300EF-02	84.18	89.48	91.79	89.48	0.978
H220ES-01	76.00	83.28	86.84	85.41	0.972
H185EA-00	78.79	87.22	91.85	91.58	0.960
F685EF-00	81.44%	87.87%	91.21%	89.63%	0.97
F685EF-01	80.50%	87.77%	91.69%	90.56%	0.9686
F200EU-02	81.87%	88.49%	91.07%	90.23%	0.98
F200EU-02	81.97%	88.64%	91.09%	90.29%	0.98
F255ES-00	84.71%	87.78%	91.42%	89.89%	0.962
F290EM-00	83.05%	87.81%	91.34%	90.18%	0.975
AC180EA-00	71.24%	82.89%	87.59%	87.62%	0.973
AC460EM-00	76.53%	84.95%	86.58%	82.76%	0.971
AC425EF-01	81.94%	88.27%	90.37%	88.45%	0.978
AC275EM-00	81.73%	87.36%	90.34%	87.43%	0.977
AC240ES-01	81.57%	88.32%	90.40%	87.96%	0.973
AC240ES-01	81.51%	88.30%	90.34%	87.99%	0.973
AC320-EM-01	82.54%	87.54%	90.93%	87.89%	0.977
AC290EM-00	81.75%	87.37%	90.88%	87.44%	0.976
AC255ES-00	80.18%	87.86%	90.71%	90.17%	0.976
AC290EM-01	80.59%	85.45%	87.50%	84.93%	0.985
AC255ES-01	80.88%	84.33%	86.71%	84.40%	0.981
AC250ES-00	78.75%	85.16%	88.05%	85.57%	0.92



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Model Number	Efficiency, 230V/50HZ				Power Factor @ 100% Load
	10% Load	20% Load	50% Load	100% Load	
B185EA-00	78.77%	88.64%	92.89%	92.52%	0.96
B255ES-01	79.62%	86.11%	88.99%	86.95%	0.97
B290EM-01	80.03%	86.11%	89.12%	87.12%	0.96
HU255ES-01	79.17%	84.49%	87.06%	84.98%	0.98
HU290EM-01	79.89%	86.34%	88.56%	86.51%	0.99
HU365EM-00	85.52%	90.81%	92.63%	90.77%	0.98
HU180EA-00	78.85%	85.53%	88.57%	87.16%	0.95
HU850EF-00	82.04%	87.43%	89.66%	86.92%	0.99

All Internal Power Supplies are tested per the “Generalized Test Protocol for Calculating the Energy Efficiency of Internal Ac-Dc and Dc-Dc Power Supplies”

The table may not contain all of the applicable power supplies, please refer to the individual EDS.

Notebook & Tablet Displays

All Dell notebooks and tablets have zero mercury in the integrated display

COMMISSION REGULATION 801/2013 (ErP Lot 26)

Network	A communication infrastructure with a topology of links, an architecture, including the physical components, organizational principles, communication procedures and formats (protocols)
Network standby	A condition in which the equipment is able to resume a function by way of a remotely initiated trigger from a network connection
Network availability	The capability of the equipment to resume functions after a remotely initiated trigger has been detected by a network port
Remotely initiated trigger	A signal that comes from outside the equipment via a network

Power Consumption requirements

	Tier 1 (1-Jan-2015)	Tier 2 (1-Jan-2017)	Tier 3 (1-Jan-2019) Subject to review in 2016
HiNA equipment	12 W	8 W	8 W
Equipment with HiNA functionalities	12 W	8 W	8 W
LoNA equipment	6 W	3 W	2 W



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Product information requirements

- a) Reference the Dell product environmental datasheets for specific product power consumption data i.e. <http://www.dell.com/product-info-datasheets-safety-emc-environmental> and/or http://www.dell.com/support/user_manuals
- b) Products requiring power management in order to meet required power limits will automatically switch into a state meeting standby and/or off mode or networked standby power limits within 20 minutes.
- c) Guidance on how to activate and deactivate wireless network ports can be found in the specific product user manual i.e. http://www.dell.com/support/user_manuals

The power consumption of the product in networked standby and guidance on how to activate and deactivate the wireless network ports are referenced in the product user manuals i.e. http://www.dell.com/support/user_manuals

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