30 July 2013 (revised 6 September 2013)

ENERGY STAR Computer Specification v. 6.0 – Comments on Final Draft from the European Commission

We provide in the following comments from the European Commission to the final draft of the ENERGY STAR v6.0 specification for computers. The comments are divided into two sections: One on the incentives for full network connectivity and one on additional comments referring to line numbers in the final draft specification.

As a general remark, we would like to recommend that the estimated qualification rates based on the dataset analysis are always stated when distributing a revised, draft specification. These rates can then be referred back to in the future if needed. We would therefore like to ask you to provide these rates. We would also recommend briefly describing the dataset because it is fundamental to setting the levels. It is suggested that this information could be included in the "Cover Letter".

Comments on Incentives for Full Network Connectivity

Regarding the incentives for the full network connectivity, we understand the need to provide incentives for the industry, however, we are worried about the uncertainty of the overall energy savings by the proposed incentive. In general, we think that an incentive for an energy efficiency feature, which allows the product to be less efficient, is not the best incentive because if the efficiency feature is not used the user will end having a less efficient product.

In this case, we believe that there are many uncertainties surrounding the use of full network connectivity and we do not know the percentage of users that will use this functionality either. We neither know how many are already using the low power modes for whom the saving potential might be marginal. For example, it is unclear how often desk based workers would utilise the full network capabilities of their computers and when they do use these features how much additional time their computers would spend in sleep mode given that there already requirements to power down to sleep after no more than 30 minutes of user inactivity within the draft ENERGY STAR v6.0.

Analysis of Qualification Rates

We have analysed the latest ENERGY STAR v6.0 dataset and identified coverage rates under various assumptions of use of Full Network Capability features (Base Capability, Remote Wake, Service Discovery / Name Services and Full Capability) and their corresponding mode weightings compared to conventional use profiles. The results are shown in Figure 1 and Figure 2 (for 2012 products only).

These analyses will provide us with knowledge on how many products would be able to qualify under the various usage profiles.

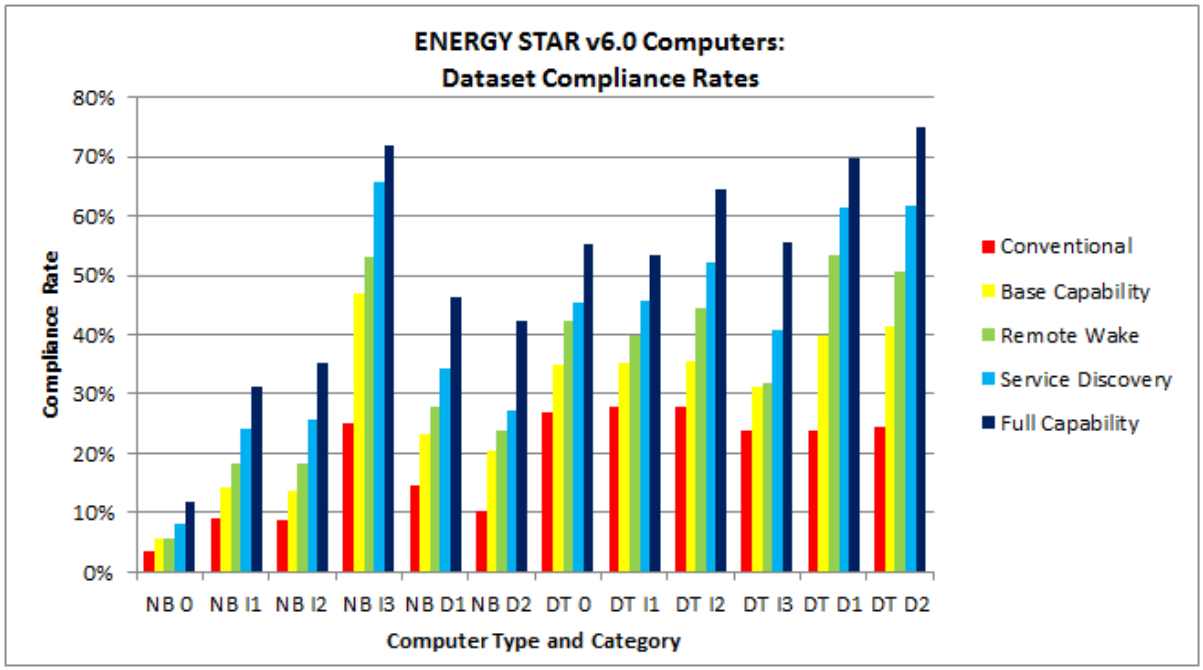

Figure 1 – ENERGY STAR v6.0 Coverage Rates for Products in the ENERGY STAR v6.0 dataset.

Each of the columns in Figure 1 shows the compliance rate assuming that all products are registered with conventional, base capability etc. use profiles respectively. Figure 2 shows the same analyses as Figure 1but for products launched onto the market in 2012.

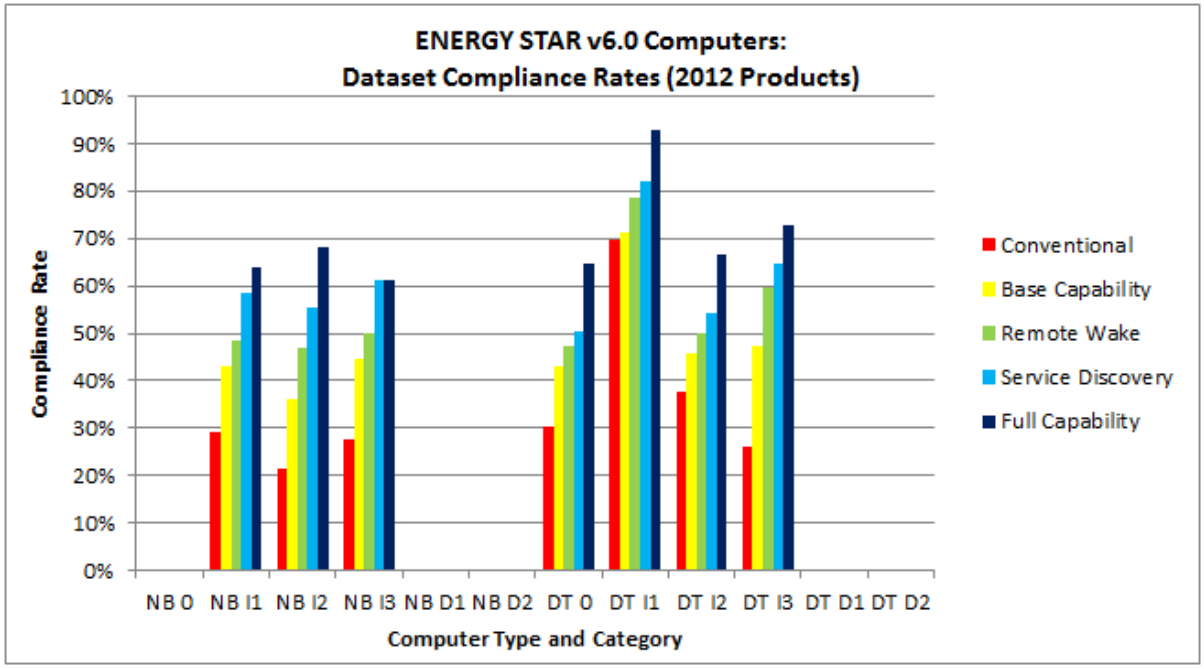

Figure 2 – ENERGY STAR v6.0 Coverage Rates for 2012 Products in the ENERGY STAR v6.0 dataset.

Figure 1 shows that by applying the conventional use profiles when determining TEC, there is a relatively low coverage rate for notebook computer (average penetration rate of 12 %). The desktop PCs have a slightly higher coverage rate (average of 26 %) when using the conventional use profiles. However, coverage rates for both notebook and desktop PCs increase significantly when the Full Capability Network use profiles are used to calculate the TEC values (average of 40 % for notebook PCs and 62 % for desktop PCs). It is understood that the computers in the ENERGY STAR v6.0 dataset are unlikely to be providing full network connectivity in sleep mode so any extra power that may be needed for this functionality is not being considered in the coverage analysis when the actual full network connectivity use profiles are applied.

Figure 2 shows the coverage rate of computers in the ENERGY STAR v6.0 dataset that were launched onto the market in 2012. Not all product categories are covered as there were relatively few 2012 products in the dataset. It is clear that the average coverage rates for products launched to market in 2012 are significantly higher than the overall average. This higher coverage rates is especially noticeable when the Full Capability Network use profiles are used (average coverage rate of 48 % for notebook PCs and 72 % for desktop PCs). Again it is recognised that the products in the dataset are unlikely to be tested with full network capability activated and so any extra power demand from this functionality is not considered in the analysis.

Analysis of Qualification Rates Assuming Additional Power Demand for Network Connectivity

We also reviewed the potential implications of sleep mode power demand when notebook and desktop PCs provided network connectivity and then assessed the potential impacts of any additional power demand requirements on expected coverage rates. A quick review suggested that many newer notebook PC products will offer network connectivity in sleep mode for no extra power demand. The situation in desktop computers is less clear but at least one research paper suggested that it would be possible to instigate a hardware solution maintain network connectivity in sleep mode for no more than 180 mW, while the authors suggested that a software solution could require four times as much power.

With these basic research results, we identified the expected coverage rates of notebook and desktop computers if additional power demand (1 W, 2 W and 5 W) was required (for desktop computers only) to deliver full network connectivity in sleep mode. The results of this analysis can be seen in Figure 3 and Figure 4. It is clear that even relatively large increases in sleep mode power demand do not drastically impact the expected coverage rates.

It is suggested that this is because sleep mode still holds relatively little weighting in the overall TEC calculation even for the full network connectivity use profiles. It should be noted that not all new products coming to market will offer full network connectivity in low power modes. Availability at first will mainly be limited to ultrabooks (regarding Connected Standby) and so not all new products will be able to use these full network capability use profiles to comply with the ENERGY STAR version 6 requirements. However, it is expected that the availability of this functionality will increase significantly post 2013.

Product Category	Total Products	Compliance Rates																	
		All dataset prods based on reported sleep mode power.					All dataset prods - 1W added to sleep mode power.				All dataset prods - 2W added to sleep mode power.				All dataset prods - 5W added to sleep mode power.			
			Full Network Connectivity															
		Conventional	Base Capability	Remote Wake	Service Discovery	Full Capability	Base Capability	Remote Wake	Service Discovery	Full Capability	Base Capability	Remote Wake	Service Discovery	Full Capability	Base Capability	Remote Wake	Service Discovery	Full Capability
NB 0	259	3%	6%	6%	8%	12%												
NB I1	634	9%	14%	18%	24%	31%												
NB I2	318	9%	14%	18%	26%	35%												
NB I3	32	25%	47%	53%	66%	72%												
NB D1	801	15%	23%	28%	34%	46%												
NB D2	59	10%	20%	24%	27%	42%												
DT 0	123	27%	35%	42%	46%	55%	34%	38%	42%	49%	33%	35%	41%	44%	28%	28%	28%	33%
DT I1	195	28%	35%	40%	46%	53%	35%	40%	43%	51%	34%	38%	42%	48%	32%	33%	36%	42%
DT I2	90	28%	36%	44%	52%	64%	32%	41%	49%	58%	32%	39%	47%	56%	31%	31%	34%	43%
DT I3	167	24%	31%	32%	41%	56%	31%	31%	35%	49%	31%	31%	33%	46%	29%	30%	31%	32%
DT D1	264	24%	40%	53%	61%	70%	39%	50%	60%	68%	38%	47%	58%	67%	34%	38%	50%	59%
DT D2	372	24%	41%	51%	62%	75%	40%	49%	59%	72%	40%	47%	56%	71%	38%	41%	50%	61%

Figure 3 – Compliance rates – all products in the ENERGY STAR v6.0 Dataset including additional power added to sleep mode requirements for desktops.

Product Category	Total Products	Compliance Rates																	
		2012 dataset prods based on reported sleep mode power.					2012 dataset prods - 1W added to sleep mode power.				2012 dataset prods - 2W added to sleep mode power.				2012 dataset prods - 5W added to sleep mode power.			
			Full Network Connectivity															
		Conventional	Base Capability	Remote Wake	Service Discovery	Full Capability	Base Capability	Remote Wake	Service Discovery	Full Capability	Base Capability	Remote Wake	Service Discovery	Full Capability	Base Capability	Remote Wake	Service Discovery	Full Capability
NB 0	4	0%	0%	0%	0%	0%												
NB I1	72	29%	43%	49%	58%	64%												
NB I2	47	21%	36%	47%	55%	68%												
NB I3	18	28%	44%	50%	61%	61%												
NB D1	0	n/a	n/a	n/a	n/a	n/a												
NB D2	0	n/a	n/a	n/a	n/a	n/a												
DT 0	125	30%	43%	47%	50%	65%	43%	46%	49%	55%	38%	43%	46%	50%	33%	33%	34%	42%
DT I1	56	70%	71%	79%	82%	93%	71%	75%	79%	88%	71%	73%	79%	86%	70%	71%	73%	77%
DT I2	24	38%	46%	50%	54%	67%	46%	50%	54%	58%	46%	46%	50%	58%	42%	46%	46%	50%
DT I3	99	26%	47%	60%	65%	73%	43%	55%	65%	71%	43%	51%	64%	67%	37%	41%	46%	62%
DT D1	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DT D2	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Figure 4 – Compliance rates – 2012 products in the ENERGY STAR v6.0 Dataset including additional power added to sleep mode requirements for desktops.

Alternative Use Profiles

We have reviewed the use profiles within the draft ENERGYSTAR v6.0 specification in order to illustrate how the alternative use profiles could reduce coverage rates for products seeking compliance using the full network connectivity use profiles but still maintaining a suitable incentive for manufacturers to use this potentially energy saving technology. By reducing the coverage rates slightly it should increase the lifetime of the ENERGY STAR v6.0 specification in the event that high percentages of computers supporting full network connectivity in the low power modes come to market over the next two years.

The suggested use profiles can be seen in Figure 5. The current draft use profiles suggest a 66 % reduction from the conventional use profile in long idle time during full capability. We suggest reducing the decrease in long idle time from the conventional use profile for both desktop and notebook computers. We also suggest reducing the time spent in off mode as it is expected that products offering full network capability in sleep mode will spend very little time turned off.

		Desktop Computer					Notebook Computer				
	Power Modes	Conventional	Base Capability	Remote Wake	Service Discovery	Full Capability	Conventional	Base Capability	Remote Wake	Service Discovery	Full Capability
Draft ESTAR v6.0 Use Profiles	Off	0.45	0.40	0.30	0.25	0.20	0.25	0.25	0.25	0.25	0.25
	Sleep	0.05	0.15	0.28	0.36	0.45	0.35	0.39	0.41	0.43	0.45
	Short Idle	0.35	0.33	0.32	0.31	0.30	0.30	0.28	0.27	0.26	0.25
	Long Idle	0.15	0.12	0.10	0.08	0.05	0.10	0.08	0.07	0.06	0.05
EC Suggested Use Profiles	Off	0.45	0.35	0.25	0.15	0.05	0.25	0.20	0.15	0.10	0.05
	Sleep	0.05	0.18	0.31	0.44	0.57	0.35	0.43	0.50	0.58	0.65
	Short Idle	0.35	0.34	0.33	0.31	0.30	0.30	0.29	0.28	0.26	0.25
	Long Idle	0.15	0.13	0.11	0.09	0.08	0.10	0.09	0.08	0.06	0.05

Figure 5 – Current and Suggested Full Network Capability Use Profiles.

Using the above suggested use profiles we have recalculated expected coverage rates to each of the use profiles. The results of this analysis can be seen in Figure 6 and Figure 7 below.

	Coverage levels 2012 Products in ESTAR Dataset - US EPA Use Profiles										Coverage levels 2012 Products in ESTAR Dataset - Altered Use Profiles									
	Compliance Rates					Weighted Average - Compliance Rates					Compliance Rates					Weighted Average - Compliance Rates				
	Use Profiles					Use Profiles					Use Profiles					Use Profiles				
		Full Network Connectivity					Full Network Connectivity					Full Network Connectivity					Full Network Connectivity			
Product Category	Conventional	Base Capability	Remote Wake	Service Discovery	Full Capability	Conventional	Base Capability	Remote Wake	Service Discovery	Full Capability	Conventional	Base Capability	Remote Wake	Service Discovery	Full Capability	Conventional	Base Capability	Remote Wake	Service Discovery	Full Capability
NB 0	0%	0%	0%	0%	0%						0%	0%	0%	0%	0%					
NB I1	29%	43%	49%	58%	64%						29%	39%	44%	51%	60%					
NB I2	21%	36%	47%	55%	68%	27%	41%	48%	58%	65%	21%	32%	36%	53%	64%	27%	36%	42%	53%	61%
NB I3	28%	44%	50%	61%	61%						28%	33%	44%	61%	61%					
NB D1	n/a	n/a	n/a	n/a	n/a						n/a	n/a	n/a	n/a	n/a					
NB D2	n/a	n/a	n/a	n/a	n/a						n/a	n/a	n/a	n/a	n/a					
DT 0	30%	43%	47%	50%	65%						30%	36%	45%	49%	53%					
DT I1	70%	71%	79%	82%	93%						70%	70%	73%	79%	86%					
DT I2	38%	46%	50%	54%	67%	44%	52%	60%	63%	74%	38%	42%	46%	50%	54%	44%	46%	53%	61%	66%
DT I3	26%	47%	60%	65%	73%						26%	35%	46%	63%	67%					
DT D1	n/a	n/a	n/a	n/a	n/a						n/a	n/a	n/a	n/a	n/a					
DT D2	n/a	n/a	n/a	n/a	n/a						n/a	n/a	n/a	n/a	n/a					

Figure 6 – Coverage Rates for 2012 Products in ENERGY STAR v6.0 Dataset under Current Draft and alternative Use Profiles.

	Coverage levels Products in ESTAR Dataset - US EPA Use Profiles										Coverage levels Products in ESTAR Dataset - Altered Use Profiles									
	Compliance Rates					Weighted Average - Compliance Rates					Compliance Rates					Weighted Average - Compliance Rates				
	Use Profiles					Use Profiles					Use Profiles					Use Profiles				
		Full Network Connectivity					Full Network Connectivity					Full Network Connectivity					Full Network Connectivity			
Product Category	Conventional	Base Capability	Remote Wake	Service Discovery	Full Capability	Conventional	Base Capability	Remote Wake	Service Discovery	Full Capability	Conventional	Base Capability	Remote Wake	Service Discovery	Full Capability	Conventional	Base Capability	Remote Wake	Service Discovery	Full Capability
NB 0	3%	6%	6%	8%	12%						3%	5%	6%	7%	10%					
NB I1	9%	14%	18%	24%	31%						9%	11%	16%	21%	29%					
NB I2	9%	14%	18%	26%	35%	12%	20%	24%	30%	40%	9%	12%	14%	21%	31%	12%	16%	21%	27%	36%
NB I3	25%	47%	53%	66%	72%						25%	38%	47%	56%	66%					
NB D1	15%	23%	28%	34%	46%						15%	18%	24%	30%	41%					
NB D2	10%	20%	24%	27%	42%						10%	14%	22%	24%	42%					
DT 0	27%	35%	42%	46%	55%						27%	31%	36%	42%	45%					
DT I1	28%	35%	40%	46%	53%						28%	33%	38%	43%	47%					
DT I2	28%	36%	44%	52%	64%	25%	38%	47%	55%	66%	28%	31%	37%	49%	56%	25%	34%	40%	49%	59%
DT I3	24%	31%	32%	41%	56%						24%	29%	31%	32%	42%					
DT D1	24%	40%	53%	61%	70%						24%	33%	43%	56%	65%					
DT D2	24%	41%	51%	62%	75%						24%	37%	45%	53%	67%					

Figure 7 – Coverage Rates for Products in ENERGY STAR v6.0 Dataset under Current Draft and alternative Use Profiles.

Conclusions Full Network Capability Analyses

The conclusion of these analyses is that the coverage rates for products providing full network connectivity in low power modes are high. It is also recognised that this functionality holds some potential to reduce overall energy use in computers. It is unclear how significant the potential savings from this network functionality would be since many computers are already turned off or placed in sleep mode during periods of inactivity. It is also unclear how many users would maintain enabling of the functionality and hence access any potential savings.

We recommend that the US EPA and the European Commission follow the development of the Full Network Connectivity and the resulting savings. On this basis, further work could be conducted to identify more suitable use profiles for products providing network connectivity in sleep mode and to better calculate potential energy savings from these functionalities.

Additional Comments

Line 38 – Slate Computing Device: Not including a definition at this time for slate/tablet computers may cause some confusion as these products may fall under the definition of "Notebook Computer" if they have detachable keyboards. In addition using the term, "Slate/Tablet" may cause some confusion over whether "notebook tablet PCS" are covered under the notebook definition (the term "Slate/Tablets" is also referenced in line 258). It is suggested that the term be limited to "Slate".

It is mentioned that the development of the Slate/Tablet definition should be postponed until version 6.1. We would like to know what the plan and time schedule are for this version. In general, the EU needs to go through the same adoption procedure for smaller and larger updates and therefore we would prefer that updates are not taking place frequently.

Line 101 – Graphics Processing Unit (GPU): The definition includes the statement "An integrated circuit, apart from the CPU". The use of the word "apart" may result in confusion as it could also refer to the physical proximity of the GPU. It is suggested that the wording be changed to, "*An integrated circuit, not the CPU*".

Line 146 – Idle State: The definition for "Idle state" includes the statement, "and the computer is not in Sleep Mode". This should be altered to reflect the other power modes that the computer may not be in during idle state (e.g. "connected sleep"/"networked sleep" etc.). The wording could be changed to, "*and the computer is not in Sleep Mode or another low power mode which is similar to Sleep Mode*".

Line 148 – Long Idle: The definition also uses only "Sleep mode" when referencing low power modes. This should also be changed to reflect the other low power modes that the computer may be woken from.

Line 157 – Short Idle: The definition also uses only "Sleep mode" when referencing low power modes. This should also be changed to reflect the other low power modes that the computer may be woken from.

Line 181– Full Network Connectivity: The definition includes the statement, "The ability of the computer to maintain network presence while in Sleep Mode or another low power mode of equal or lower power consumption ("LPM"). The US EPA have stated that computers which do not offer a sleep mode but offer full network connectivity may use long idle power demand levels when calculating TEC. However, if a computer does not provide full network connectivity at the same (or less) power demand found in sleep mode then, by virtue of the definition, the computer cannot provide full network connectivity. In addition, it would be necessary to test a product in normal sleep mode (unconnected) and a connected low power mode to determine if this condition of the definition were being met. We suggest that this definition be reviewed in conjunction with any further guidance on the use of sleep mode, connected sleep mode or long idle when determining the total TEC limits of computers.

Line 202 – Wake Event: The definition also uses only "Sleep mode" and "off mode" when referencing low power modes. This should also be changed to reflect the other low power modes that the computer may be woken from.

Line 207 – Wake On LAN (WOL): The definition also uses only "Sleep mode" and "off mode" when referencing low power modes. This should also be changed to reflect the other low power modes that the computer may be woken from.

Line 209 – Switchable Graphics: The definition includes the statement, "Functionality that allows both integrated and discrete graphics to be used at different times depending on the graphics rendering needs of the user". Some forms of switchable graphics employ the integrated GPU at all times and just switch the discrete GPU off when instructed. The definition should be changed to encompass this type of switchable graphics technology. The definition could be changed to, "*Functionality that allows discrete graphics to be disabled when not required in favour of an integrated graphics solution*".

Line 240 – Notebook Computers and Tablet Computers: Using the term "Tablet Computers" here but not in the definition may cause confusion especially when the specification includes the word "Tablets" when referencing excluded products (line 38 and 258). We suggest either removal of the term "Tablet computers" in line 240 or the inclusion of "Tablet Computer" in the notebook computer definition.

Line 309 – Products that do not support Sleep Mode by default are only subject to the Display Sleep Mode requirement: This appears to be a very open ended exemption for products which do not support sleep mode. We would like to see some further clarification on which products are not required to have a sleep mode.

Line 311 – Table 2: Power Management Requirements: There is an exemption on the "System Sleep Mode" requirements for products that do not support sleep mode or where sleep mode is not used as part of the TEC equation. This could in effect allow all products that do not use sleep mode in the TEC calculation (by virtue of the fact that they have used long idle when supporting network connectivity) not to have a sleep mode. We feel that this is a very large exemption and does not fit well with the EU Ecodesign regulation on computers which requires all computers (placed on the EU market post July 2014) to offer a sleep mode or

other low power mode that does not have a higher power demand requirement than sleep mode and that power management on products is enabled when placing products on the market (default to power down after 30 minutes of user inactivity). This exemption also does not fit well with the ENERGY STAR v6.0 requirement listed in **line 359**, which states that "Products shall be capable of Sleep Mode".

It is suggested that the exemption listed on the bottom of page 8 is reworded to, "*Where Sleep Mode power is used as part of the TEC equation for the UTT qualification, this requirement shall only be met when the product is not providing Full Network Connectivity functionalities*". The statement should apply to all three of the main power management requirements.

Line 320 – User Information Requirements: It is stated that, "A note stating that default power management settings have been selected for compliance with ENERGY STAR (within 15 min of user inactivity for the display, within 30 min for the computer, if applicable per Table 2), and are recommended by the ENERGY STAR program for optimal energy savings". Including an exemption here for products that are not using sleep mode in the TEC calculations risks that users will not be aware of alternative power management settings and how full network connectivity may be disabled. It is suggested the following wording be added to the section, "*Users shall be informed if the power management settings for compliance with ENERGY STAR have not been selected due to enhanced network functionalities. Where products are shipped without ENERGY STAR power management settings enabled then users shall be provided with information detailing how they may be enabled*".

Line 337 – Documentation: This requirement seems to be trying to limit manufacturers from supplying the information in 3.4.1 (Line 314) only for ENERGY STAR qualified computers or with EPA approved customer guidance. The requirements included in 3.4.1 are also included in a number of other environmental initiatives outside of ENERGY STAR.

Line 347 – Integrated Display adder allowance: It is unclear if this adder can only be applied once or whether it may be applied more than once if a product has two or more displays. We would suggest that this is clarified in the specification to avoid any confusion.

Line 359 – Products shall be capable of Sleep Mode: It is suggested that this requirement be expanded to ensure that users have the ability to enable sleep mode (i.e. disable Full Network Connectivity) should they so wish. We would suggest wording to the effect, "*Products shall be capable of Sleep mode which can enabled by the user*".

Line 360 – Use of Long Idle: The definition for Full Network Connectivity in line 181 includes, "The ability of the computer to maintain network presence while in Sleep Mode or another low power mode of equal or lower power consumption ("LPM")". This suggests that it is therefore not possible for computers to offer Full Network Connectivity unless their Long Idle or Connected Sleep Mode Power demand is equal to or less than the power demand in Sleep mode.

Line 384 and 385– Mode Weightings: We are unaware of any research that has been conducted to identify suitable use profiles for products that provide full network connectivity. We strongly suggest that further research is conducted into suitable full network connectivity use profiles for the next ENERGY STAR computer specification. Understanding how full network connectivity is used in both domestic and non-domestic premises will help to understand the actual savings potentials of these functionalities.

Line 407 – Table 5: Power Supply Efficiency Allowance: There appears to be no incentive for desktop computers that are supplied with efficient external PSUs. The PSU allowances are listed to different decimal places (i.e. 0.03 should be listed as 0.030).

Line 412 – Table 6: Base TEC (TECBASE) Allowances: The DT I3 and DT D2 categories are awarded the same base allowance despite the fact that the DT D2 category has a higher performance score (and a GPU adder of 50% of a G1 GPU may be added to the DTI3 to account for switchable graphics). This suggests that either the base allowance for the DT I3 category needs to be reduced or some extra allowance is given in the GPU adder for the DT D2 category (if warranted).

Line 414 – Footnote iv: It is stated that, "Discrete Graphics capability is categorized based on frame buffer bandwidth, as shown in Table 7". It should also be noted that frame buffer bit-width is also used in the categorization of G6 and G7 dGfx.

Line 414 – Footnote v: It is stated that, "P = [# of CPU cores] × [CPU clock speed (GHz)] , where # of cores represents the number of physical CPU cores in the notebook and CPU clock speed represents the Max TDP core frequency, not the turbo boost frequency". This sentence omits desktop and integrated desktop computers and so should be changed to "*P = [# of CPU cores] × [CPU clock speed (GHz)] , where # of cores represents the number of physical CPU cores in the notebook, desktop or integrated desktop and CPU clock speed represents the Max TDP core frequency, not the turbo boost frequency*".

Line 427 – Table 7: Functional Adder Allowances for Desktop, Integrated Desktop, Thin Client, and Notebook Computers: Whilst frame buffer bandwidth is defined there is no definition for "width" of the GPU. It is suggested that the term "Frame Buffer Width" is used to clarify what is meant by "width".

It is clear that the displays adders for both integrated desktops and notebooks are significantly different to the requirements laid down in ENERGY STAR v6.0 for displays. It is unclear why displays used in integrated desktop and notebook computers are treated in a different manner.

The memory adder for notebook computers has doubled (from 0.4 kWh in ENERGY STAR v5.0 to 0.8 kWh in ENERGY STAR v6.0) despite improvements in the energy efficiency of RAM modules on the market. In addition, the 0.4 kWh allowance in ENERGY STAR v5.0 could only be added after an initial base memory of 4GB. The allowance in ENERGY STAR v6.0 appears to apply to all memory in a computer without any base allowance. A notebook computer with 16 GB RAM would receive an additional allowance of 12.8 kWh/year. This allowance is almost comparable to the base allowance for the first category of notebook computers.

The same memory adder applied to desktop computers is also more generous than in ENERGY STAR v5.0 under certain circumstances. For example, a desktop PC with a four core CPU running at 3.6 GHz, a discrete GPU over 128 bit-width and 16 GB RAM would receive a memory allowance of 9.6 kWh/year under ENERGY STAR v5.0 and 12.8 kWh/year under ENERGY STAR v6.0.

We believe that the memory adders should be based on the power demand of energy efficient RAM modules currently found on the market.

The internal storage allowance for desktop and integrated desktop computers has increased from 35 kWh/year in ENERGY STAR v5.0 to 26 kWh/year in ENERGY STAR v6.0 despite improvements in the energy efficient of internal storage devices since 2008 (when the ENERGY STAR v5.0 specification was finalized).

Our data on storage power demands into the ENERGY STAR v6.0 specification process show that the current adders are too high. We believe that the additional storage adders should be based on the power demand of energy efficient storage devices currently found on the market. In this way manufacturers will be encouraged to include efficient storage devices in products.

Providing large adders for memory and storage may encourage some manufacturers to qualify a particular configuration of a product model by adding in extra memory and/or storage devices. Manufacturers can then communicate to the market that compliance to "ENERGY STAR depends on model configuration". Purchasers would then be expected to understand that not all configurations of a particular product would meet the EN-ERGY STAR specifications (it is recognised that the testing requirements diminish this threat to some extent).