41 Barry Street (PO Box 709)
Bayswater Vic 3153
Australia
A.C.N. 005 227 234
ABN 43005227234

DYNE

Industries Pty Ltd

Phone: +61 3 9720 7233
Fax: +61 3 9720 7551
Email: fsmit@dyne.com.au
Web: www.dyne.com.au

Submission in Response to
ENERGY STAR Program Requirements for Single Voltage Ac-Dc and Ac-Ac Power Supplies
Eligibility Criteria (Version 2.0) Draft 1
on behalf of Dyne Industries Pty Ltd and Soanar Ltd in Australia.

The information supplied by United States Environmental Protection Agency Office of Air and Radiation in their letter of October 11, 2007 along with its enclosures has been reviewed by **Dyne Industries Pty Ltd and Soanar Ltd** in order to comment on the feasibility of complying with the proposed Energy-Efficiency Specifications.

The following comments are made in view of the best available information at this time and designs using the best available materials in Australia.

Ac-Dc External Power Supplies

We accept the proposals for Ac-Dc power supplies without alteration or exception because the performance requirements can be met with existing technologies, or where these technologies fail to meet them today the improvements required are small and are expected to be practical in the near future.

Ac-Ac External Power Supplies

The following submission is in relation to the performance, efficiency and no load requirements of AC-AC power supplies.

The information in the spreadsheet “ENERGY STAR_V2.0 EPS Masked Dataset_Oct07.xls” supplied as an enclosure to the letter combined both Ac-Ac and Ac-Dc External Power Supplies. In order to concentrate on the Ac-Ac power supplies I have sorted the information and deleted the references to Ac-Dc External Power Supplies.

Enclosed is the resulting new spreadsheet “ENERGY STAR_V2.0 EPS Masked Dataset_Oct07 FS MODS.xls”.

It can be seen from the sorted information in the modified spreadsheet that all the Ac-Ac power supplies tested have an output power of no more than 12.0 VA (Watt at unity power factor). In all those cases it should be feasible to meet the proposed requirements of the draft. However it is not reasonable to extrapolate the requirements to cover ratings up to 250VA.

The attached spreadsheet “20071024 Summaries of Loss and Efficiencies.xls” shows the results of tests done at 50 Hz on a number of transformers with output power ratings of 10 to over 250 VA. The yellow section in each of the sheets shows the normal operating flux density of 1.0 to 1.55 Tesla depending on core material and transformer size.

It can be seen from “20071024 Summaries of Loss and Efficiencies.xls” that it is not practical to manufacture a transformer greater than 17 VA with a no-load loss less than 0.5 Watt.

As shown in our earlier submissions to the Australian Greenhouse Office – and later copied to the United States Environmental Protection Agency by email to Robin Clark at ICF International on August 9, 2007 – it is feasible with current technology to meet the required efficiency and also the maximum no-load loss of 0.5 Watt for Ac-Ac power supplies up to 12 VA without the need to use grain oriented core steel and possible up to about 17 VA with grain oriented core steel.

Therefore the proposed value of 0.5 Watt no-load loss is acceptable for Ac-Ac power supplies up to the proposed output power of 15 VA.

For output power greater than 15 VA but less than or equal to 40 VA it is possible to meet the existing Mark III requirement of 0.75 Watt no-load loss with the use of grain oriented core steel. In all these cases

it is feasible with existing technology to meet all the required Average Efficiency in Active Mode. With advances in technology it may be possible to increase the output power figure to 50 VA at 60 Hz and still meet the Mark III no-load loss of 0.75 Watt. (All our tests and calculations are done at 50 Hz).

For output power greater than 40 VA (or possibly 50 VA as noted above) present technology does not make it possible to meet the no-load power loss of 0.75 W and still maintain a practical design.

It is conceded that there may be other materials which will provide marginally better results but these are either unrealistically expensive for consumer type products or are not available in Australia including imported products from all known suppliers worldwide.

It is further conceded that all our tests and designed have been performed on the basis of 50 Hz equipment and, where relevant, complying with the size, weight and torque restraints to meet Australian Standards for external power supplies fitted with pins for direct insertion into power outlet sockets. At 60 Hz the size reduction of the magnetic components will give some advantage but generally not sufficient to be significant to this discussion.

I refer to the Revised Regulatory Impact Statement, Report no 2007/07 issued under the auspices of the Australian Greenhouse Office which recommends that the no-load loss requirements for Ac-Ac external power supplies be limited to external power supplies with an output power not exceeding 40 VA. **I support that recommendation.**

I also submit **that if the above recommendation is not adopted the no-load loss be limited to a percentage, calculated by the formula below, of the output power for all Ac-Ac external power supplies with an output power greater than 15 VA.**

Formula:

Where Pno is the rated output power.

No-load Loss as a %age of Pno = 2+(250-Pno)*1.333/(250-15)

Or simplified to:

No-load Loss as a %age of Pno = 2+0.00566*(250-Pno)

No-load Loss = (Pno*(2+(0.00566*(250-Pno)))/100) Watt

The formula was developed as follows:

The slope of the line from 0.50 W at 15 VA to 5.00 W at 250 VA is (3.333-2)/(250-15) = .0056596

The logic of the formula is that the no-load loss calculates out to 3.33% or 0.5 Watt at 15 VA and 2% or 5 Watt at 250 VA.

These figures are realistic with current technology.

If the formula can be simplified and still achieve the same result I would be delighted.

The results of the calculation are shown in “No-load Loss Calc’s” in the spreadsheet “20071024 Summaries of Loss and Efficiencies.xls” where only the yellow cell is unprotected.

Recommendation:

That the no-load loss of Ac-Ac External Power Supplies be the greater of:

No-load Loss = 0.5 Watt

Or

No-load Loss = (Pno*(2+(0.00566*(250-Pno)))/100) Watt