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**Subject:** RE: Final Draft Version 3.0 ENERGY STAR Specification for ENERGY STAR

I would like to propose a different method of acquiring MUP for professional amplifiers.

It is more and more acknowledged that music is not sustained tones. This is the reason why many standards are based on testing at a power equivalent of  $1/8^{\text{th}}$  of the maximum rms power of the device. Many producers of amplifiers have realized that this means that the amplifier does not have to be capable of delivering this maximum rms power continuously ("MUP"). Here are some examples of how different manufacturers define their "MUP":

- CEA-2006-B : 20 ms burst every 500 ms, -20 dB inbetween => 16 dB Crest factor
- Lab.gruppen proprietary 12 dB burst : 25 ms burst every 400 ms, -11.98 dB inbetween => 12 dB Crest factor (=> it sustains  $1/8^{\text{th}}$  power over time)
- EIAJ : 8 ms burst every 40 ms, -inf inbetween => 10 dB Crest factor
- *If a really tough one is deemed desirable, then we could have one that has 50 ms burst every 200 ms (=240 BPM), lower level inbetween such that the sustained Crest factor is 10 dB. Noone is using a burst that is this tough as of today.*

One could argue at length which one is the most representative and one can definitely invent more of these types. Our proposal is that a repetitive burst signal is selected that has a burst length of 20 ms or more and a repetition rate of 500 ms or more often.

MUP is found when the last period of the burst has an amplitude that is attenuated 1-10% compared to the first period in the burst\*. This is easy to detect with a simple oscilloscope and the test signal can be a wav file that we make available online for free. MUP is then the RMS power of the first period in this burst.

\*If the amplifier has some sort of limiting that prevents this from happening, then MUP is found when the burst level cannot be increased anymore or when there is a noticeable "flattop" of the burst. Companies capable of measuring distortion in a burst should stop when the distortion is 1%.

We can do some voting between stakeholders to agree upon which burst is perceived to be fair and representative. The main thing is that we switch to a repeated burst test signal to define MUP.

The Pout should be as before; Pout = MUP / 8.

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I will be at the InfoCOMM show from Wednesday to Friday. Please contact me should you wish to discuss this face to face.

Best regards,

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