

Appliance Standards Awareness Project  
American Council for an Energy-Efficient Economy  
Consumer Federation of America  
Consumers Union  
National Consumer Law Center  
Northeast Energy Efficiency Partnerships  
Northwest Energy Efficiency Alliance  
Northwest Power and Conservation Council

February 20, 2018

Dr. Stephanie Johnson  
U.S. Department of Energy  
Office of Energy Efficiency and Renewable Energy  
Building Technologies Office, EE-5B  
1000 Independence Avenue, SW  
Washington, DC 20585

**RE: Docket Number EERE–2017–BT–TP–0024: Request for Information for Test Procedures for Microwave Ovens**

Dear Dr. Johnson:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficient Economy (ACEEE), Consumer Federation of America (CFA), Consumers Union (CU), National Consumer Law Center (NCLC), Northeast Energy Efficiency Partnerships (NEEP), Northwest Energy Efficiency Alliance (NEEA), and Northwest Power and Conservation Council (NPCC) on the request for information (RFI) for test procedures for microwave ovens. 83 Fed. Reg. 2566 (January 18, 2018). We appreciate the opportunity to provide input to the Department.

The time is ripe for DOE to review the test procedures for microwave ovens given upcoming statutory deadlines for both standards and test procedures: DOE is required to publish a proposed rule or negative determination for standards by June 2019 and to complete a review of the test procedures by January 2020. As described below, we encourage DOE to establish a test procedure for active mode energy use, which represents almost 90% of total microwave oven annual energy consumption. An active mode test procedure would provide valuable purchasing information for consumers and would allow manufacturers to distinguish efficient products, some of which may contain features that also increase consumer utility. In addition, as more “connected” microwave ovens are introduced to the market, it is important to capture the energy use of these features, which will encourage manufacturers to provide these features with low power consumption, ultimately benefiting consumers.

**We encourage DOE to establish active mode test procedures for microwave ovens.** There are currently no DOE test procedures to measure the active mode energy use of microwave ovens. Without a test procedure, there is no way for consumers to be able to compare the

cooking efficiency of microwave oven models in making purchasing decisions, nor a way for manufacturers to distinguish more-efficient products.

As shown in Table 1 below, DOE estimated in the February 2013 NOPR that on average, microwave-only ovens consume 71.1 kWh per year in active (cooking) mode.<sup>1</sup> For microwave-only ovens, the current standards for standby/off mode limit standby power consumption to 1 W, which translates to an annual energy consumption of 8.7 kWh. Thus, for a microwave oven just meeting the standby standard, the average active mode energy consumption is almost 90% of the total annual energy consumption, and yet this energy use is not currently measured as part of the test procedures.

Table 1. Average active mode and standby/off mode annual energy use for a microwave-only model just meeting the standby standard

|                       | Annual hours (hours) | Power (W) | Annual energy use (kWh) |
|-----------------------|----------------------|-----------|-------------------------|
| Active (cooking) mode | 44.9                 | 1582.7    | 71.1                    |
| Standby/off mode      | 8715.1               | 1.0       | 8.7                     |

Note: Assuming the average power consumption for active mode and the standby power of a unit just meeting the standard (1 W).

DOE’s test data show that there is significant variation in active mode energy use among models. In the 2013 NOPR, DOE presented test results for 15 units, which indicated that the weighted-average energy consumption of the units tested ranged from 50.4 to 66.5 Wh to heat the specified water load. In other words, the least-efficient model in the test sample consumed 32% more energy than the most-efficient model to heat the same water load. And yet because there is currently no test procedure to measure energy use in active mode, consumers have no information about the variation in energy use among models.

Further, there may be technologies available to significantly improve microwave oven efficiency in active mode. In particular, solid-state radiofrequency (RF) components may improve efficiency compared to conventional magnetron technology. Solid-state RF components also have the potential to deliver greater consumer utility in the form of more even heating and longer lifetimes.<sup>2</sup> However, without a test procedure, manufacturers do not have a way to distinguish the potential improved performance of microwave ovens utilizing new technologies, which may also offer new features to consumers.

**We support using IEC Standard 60705 to measure energy consumption in microwave-only mode.** IEC Standard 60705 has been demonstrated to be a repeatable and reproducible test method to measure active mode energy consumption. DOE notes in the RFI that test results of microwave ovens tested according to a draft version of the IEC standard presented in the 2013 NOPR “showed minimal test-to-test variation for each water load size.”<sup>3</sup> The RFI also notes that

<sup>1</sup> 83 Fed. Reg. 2569.

<sup>2</sup> <http://www.eenewseembedded.com/blog/cooking-better-microwave-oven>.

<sup>3</sup> 83 Fed. Reg. 2570.

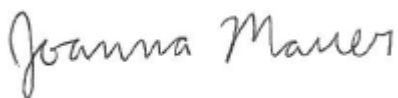
the European Committee for Electrotechnical Standardization (CENELEC) conducted a round-robin testing program to evaluate the IEC standard and found it to be both repeatable and reproducible.<sup>4</sup> Adopting a test procedure for microwave-only mode based on IEC Standard 60705 would also harmonize with an international industry test standard.

**We encourage DOE to investigate a potential test procedure to measure energy consumption in convection mode.** In the 2013 NOPR, DOE estimated that for convection microwave ovens, the energy use of convection-only and convection-microwave cooking combined represent more than half of total active (cooking) mode energy consumption.<sup>5</sup> Therefore, a test procedure that ignores convection mode would ignore a substantial portion of the energy consumption of convection microwave ovens. However, we recognize that there may be challenges in developing a representative and repeatable test method for convection mode. We encourage the Department at a minimum to establish an active mode test procedure to measure microwave-only mode for convection microwave ovens.

**We encourage DOE to ensure that any power consumption associated with Bluetooth or internet connections is captured in the test procedures.** In the RFI, DOE notes that there is at least one manufacturer that offers a microwave oven model that uses Bluetooth technology.<sup>6</sup> In addition, while the RFI notes that DOE is not aware of any microwave ovens currently on the market that include internet connections, it appears that multiple manufacturers have plans to introduce “connected” microwave ovens.<sup>7</sup> We encourage DOE to ensure that any power consumption associated with these features is captured in the test procedures. If the power consumption of “connected” features is not captured in the test procedures, consumers will not have any information about these features’ energy use, and manufacturers that develop ways to provide these features with low power consumption will not be able to distinguish their products in the market.

Thank you for considering these comments.

Sincerely,



Joanna Mauer  
Technical Advocacy Manager  
Appliance Standards Awareness Project



Jennifer Amann  
Buildings Program Director  
American Council for an Energy-Efficient  
Economy

---

<sup>4</sup> 83 Fed. Reg. 2570-71.

<sup>5</sup> 83 Fed. Reg. 2570. Table II.4.

<sup>6</sup> 83 Fed. Reg. 2573.

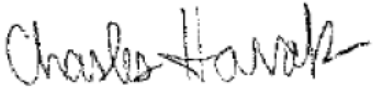
<sup>7</sup> See, for example: <https://www.theverge.com/2018/1/4/16849306/alexa-microwave-oven-controls-added-ge-kenmore-lg-samsung-amazon>; <https://www.cnet.com/news/whirlpools-wi-fi-microwave-will-tell-you-when-your-foods-ready-according-to-government-filing/>.



Mel Hall-Crawford  
Energy Projects Director  
Consumer Federation of America



Shannon Baker-Branstetter  
Senior Policy Counsel, Energy and  
Environment  
Consumers Union



Charles Harak, Esq.  
National Consumer Law Center  
(On behalf of its low-income clients)



Claire Miziolek  
Technology & Market Solutions Manager  
Northeast Energy Efficiency Partnerships



Charlie Stephens  
Sr. Energy Codes & Standards Engineer  
Northwest Energy Efficiency Alliance



Tom Eckman  
Senior Advisor  
Northwest Power and Conservation Council