

REF NO.	Topic	Comment Summary	ENERGY STAR Response
1	Built-In Refrigerator-Freezers	EPA should not single out for added stringency built-in refrigerator-freezers, which represent well less than 2 % of the market and have historically had far fewer ENERGY STAR sales than conventional products. EPA should reconsider its decision to require higher efficiency requirements for built-in refrigerators than all other refrigerator product classes. The requirement should be set at 10% for all refrigerator product classes.	After further analysis of market and energy performance data, EPA has amended the built-in refrigerators and refrigerator-freezers criteria to 10% less energy than the 2014 federal standard.
2	CF - General	The five percent energy credit for connected refrigerators is strongly supported. EPA's proposal to require connected appliances to be able to receive and respond to open standards-based signals from a utility or another third party service provider is also supported. Any additional energy use added by connected features should be captured in the test procedure and reflected in the specification.	EPA has proposed a five percent energy criteria allowance for connected refrigerators, to help drive near-term, consumer value through the availability of new energy savings and convenience features. This functionality may also provide future benefits to the electric grid once the supporting infrastructure is built.
3	CF - General	There are concerns regarding the unproven amenity provided by connected appliances, in particular the demarcation between the manufacturer and retailer claims regarding connected and the energy performance attributed to ENERGY STAR, the minimum testing for the energy and demand performance of connected, and the expectations of surrounding local utility DR program options (if any). The use of the DOE test procedure for all energy related aspects of connected and having minimum functionality that would enable the appliance to participate in a DR or IDSM program to be specified and then verified for inclusion in the ENERGY STAR program is supported.	EPA believes ENERGY STAR recognition of products with connected functionality will 1) help drive consumer adoption of these products and 2) enable utilities and other interested parties to incent products capable of participating in smart grid DRLC programs. The Final Draft specification continues to require products be tested to the ENERGY STAR Program Requirements Product Specification for Residential Refrigerators - Test Method to Validate Demand Response in order to be eligible for the connected allowance.
4	CF-General	EPA is encouraged to articulate its vision for "connected" to all potentially affected stakeholders, through a rollout and management plan, which identifies the fundamental purpose of this new program element. A clear articulation of EPA's vision will help program administrators fully understand the strategic direction of the Program, and ultimately help grow the equity of ENERGY STAR. Further, market research on how connected is perceived by consumers would also help inform program design, assist in managing consumer expectations, and protect the integrity of the brand.	EPA appreciates these recommendations and is developing a communications plan specific to ENERGY STAR with connected functionality. EPA will also monitor the market to evaluate consumer response to products with this functionality. EPA welcomes the opportunity to collaborate on this research with the range of ENERGY STAR partners interested in this topic.
5	CF-General	Customer-supplied broadband may be a viable way to achieve connectedness within a customer's home, but there are significant numbers of consumers who do not have broadband and/or wireless access. Some other customers may not be willing to support the use of their broadband connection by the utility or appliance manufacturers. Given that the ENERGY STAR program is a mass market program, it is recommended that a connected appliance be equipped to communicate via all major communication pathways or requiring a standardized modular port. A modular approach that is based on an open standard is one option to address this diversity and provide consumers with flexibility.	EPA appreciates this comment and had supported the use of open standards through these proposed requirements, agreeing that they enable access by a broader mix of customers and also drive down cost. EPA concurs that there is currently a wide array of communication protocols being used to connect dispatchable residential loads to the Smart Grid. However, in order to ensure interoperability while maintaining low incremental product costs, EPA has not mandated that products "communicate via all major communication pathways." In the near term, the use of in-home hubs or gateways or other means may be necessary until the market better defines the key communication protocols.
6	CF - General	As some utilities are moving towards offering time-based pricing in the residential market, a consumer may enroll in a time-based rate to capture the financial benefits of their connected appliance. The current DOE draft test procedure for DR functionality only addresses reliability-based signals, though time-based pricing is mentioned as a possible signal type. While reliability may be an important consideration for DR events, the price of power will also be important and could more frequently determine DR events, particularly for purposes of delaying and shifting load. Consequently, a test method that can evaluate the appliance's ability to respond to price signals will be necessary to verify that the consumer will capture the financial benefits of DR.	DOE and EPA appreciate the comments regarding the specific signals included in the requirements for a connected refrigerator. The two signals included, TALK and DAL, were initially suggested by manufacturers and stakeholders as the core responses that define a connected refrigerator. In future specification revision efforts, DOE and EPA plan to investigate other signal types and responses, while carefully considering the impact they may have on the qualification process and verification testing.

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7	CF - Connected Refrigerator or Refrigerator-Freezer System	<p>The minimum requirement for open standards-based connectivity as proposed in the specification is not supported. The development of new technologies and equipment based on the use of open standards for all communications protocols related to Smart Grid is supported. An internet-based solution combines open communication standards with near universal acceptance and can provide robust and secure data transfer and demand response messaging, while adapting to the needs of the future. EPA's proposal is not sufficient to meet the needs of interoperability with immediate benefits to the consumer.</p> <p>The emphasis provided in the regulation "on the consumer's premises" restricts innovation for manufacturers and favors a particular design configuration. On line 177, EPA should remove the words "on the consumer's premises" to allow the Internet path, i.e. protocol translation in the "cloud". To address the open access requested by other stakeholders such as utilities, it is suggested that language should be inserted into the cover letter to acknowledge that all parties would revisit the "access" issue 12 months after the specification goes into effect.</p>	<p>Since Draft 3, EPA has further engaged stakeholders as to whether connected products should enable open standards-based connectivity on the customer's premises. EPA recognizes there are firm and differing views among stakeholders.</p> <p>In light of feedback on the Draft 3 specification, as well as the updated Draft 3 connected criteria document; EPA has concluded that the proposed requirement for a connected R/F system to include "...at least one supported configuration that is capable of receiving and directly responding to open standards-based energy related commands "on the consumer's premises" is overly prescriptive at this early stage in the market deployment of connected functionality in refrigerator/freezers, may limit innovation and drive up costs. As such, in the Final Draft specification, EPA indicates a preference for products that enable on-premises open standards connectivity, while allowing alternate approaches.</p>
8	CF - Connected Refrigerator or Refrigerator-Freezer System	<p>EPA's proposal to disallow architectures that do not provide an open, non-proprietary means of achieving grid connectedness within the bounds of the customer's premises is applauded. Consumers are currently using a number of different communications technologies and protocols depending on available infrastructure and regulatory environments. Maintaining a focus on openness and neutrality will allow EPA to define the objectives of a connected architecture, while avoiding conflicts with the efforts of standards bodies. EPA is encouraged to keep this high-level principle in mind as it develops tight language to ensure open, non-proprietary communication.</p>	<p>EPA intends to monitor the market, including interconnection of connected appliances by utilities, and may consider associated criteria revisions to further encourage realization of energy savings associated with Smart Grid interconnection.</p>
9	CF - Connected Refrigerator or Refrigerator-Freezer System	<p>While cloud-based connectivity is encouraged, allowing cloud-based translation of proprietary protocols to open standards as a sufficient pathway to be listed as "connected" by ENERGY STAR will compromise EPA's strategic objectives.</p> <p>EPA continues to be encouraged to require open standards at the appliance, so that consumers may allow any device or service provider to communicate with the appliance directly within the premises of the home, without relying on a cloud-based system provided by the appliance manufacturer. EPA and its partners are encouraged to monitor the market for the following:</p> <ol style="list-style-type: none"> 1. Consumers buying a connected product have the expectation that they will ultimately be able to choose to connect the device with other products in their home such as electronics, computers, and peripherals, to a home area network in several different ways (e.g. Wi-Fi, Ethernet, HDMI, a cellular network, etc.), or various service providers. It will be necessary to manage consumer expectations about the requirements to connect, and the uncertainty surrounding their eligibility for participation in utility programs, particularly when a cloud-based system is outside of what consumers expect from a connected product. 2. A cloud-based system runs the risk of reducing consumer choice by coupling them to a particular manufacturer's offering, potentially in perpetuity. Any program element that jeopardizes consumer privacy will be difficult to adopt for program administrators. 3. Cloud based translation creates a potential weak link in achieving connectivity. Consumers who purchase a "connected" appliance listed by ENERGY STAR that only connects via the cloud will be dependent on the appliance manufacturer maintaining a high-quality service 24/7/365, which may not be feasible. 4. During outages, local connectivity within the premises of the home enables use of on-site photovoltaic, battery storage, or other resources to maintain power. Ideally, a home energy management system could utilize connected functionality in these times. However, under a cloud-based approach this may not be feasible. 	<p>Given the range of possible approaches and despite some strongly held preconceptions, the Agency believes it is ultimately in the consumer's interest for the market to be free to test a range of options, constrained only by the consumer-oriented objectives the ENERGY STAR program is seeking to advance such as consumer control. In the Final Draft specification, EPA indicates a preference for products that enable on-premises open standards connectivity, while allowing alternate approaches.</p> <p>EPA further intends to monitor the connected appliance market, including uptake of connected appliances by consumers and utilities, and may consider associated criteria revisions to further encourage realization of energy savings associated with Smart Grid interconnection.</p> <p>EPA also encourages stakeholders to share findings and data associated with their market monitoring activities to help inform refinement of connected product criteria.</p>

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10	CF - Connected Refrigerator or Refrigerator-Freezer System	<p>If utilities and other third parties are required to interface with each manufacturer's cloud-based solution in the future, then there may be added cost and complexity, which may impact the cost effectiveness of demand response and energy efficiency programs. Also, cloud-based solutions could compromise customer data privacy and security due to the introduction of a third party into the flow of customer data and appliance control, which may not be the customer's preference. Requiring that the appliance communicates in an open, non-proprietary manner from within the customer's premises provides the customer with the ability to choose who "manages" their appliances in the future and would help ensure that the customer is afforded the ability to choose which offer to participate is based on their own needs and wants. While not the preference, alternative means for achieving two-way connectedness could be supported so long as the customer has the ultimate say and emerging pathways are not squelched.</p>	<p>EPA understands that cost effectiveness is critical to both utilities and to appliance manufacturers. By indicating a preference for products that enable open standards-based on-premises connectivity but allowing alternate communication architectures, EPA intends to let market forces drive the refinement of communication architectures for connected appliances.</p>
11	CF - Connected Refrigerator or Refrigerator-Freezer System	<p>Some specification language could be perceived as contradictory and merits clarification. Specifically: - Note 1 (lines 187-89) mentions the "internet/cloud" as an option to achieve open standards-based communication. This is inconsistent with line 230. It is recommended that this language be changed to ensure clarity about the need for translation to occur within the premises of the home. - Further, in section 4C (line 313-315) EPA states that "...to able interconnection with the product, an interface specification, API or similar documentation shall be made available to interested parties." This is interpreted to apply only to aspects of connected for which no open standards currently exist. However, this language could be perceived by other readers as an alternative to open, standards-based communication since API's are often associated with proprietary communication. It is recommended that EPA clarify that a vendor-provided API is not a viable alternative to the use of open standards-based communication to achieve interoperability.</p>	<p>The Note 1 associated with Figure 1 is accurate. Figure 1 is intended to be broadly cover all connectivity options, which may include cloud-based elements in the signal path.</p> <p>Noting that open standards may include provisions for non-standardized commands or for passing proprietary functionality, EPA has retained API criteria in order to ensure open access to the connected functionality in sections 4D, 4F, 4G and 4H.</p>
12	CF- Communications	<p>The CEA 2045 solution, utilizing existing FM radio broadcasting stations and networks employing a communications system based on the FM RDS radio, is an excellent candidate for addressing the stated objectives of ENERGY STAR "connected" Program Requirements: near term value, providing a jump-start for the industry, consumer-centric options, and ease of use (plug and play).</p>	<p>EPA has approached connected by looking to recognize new opportunities that offer near-term benefits for consumers (e.g., alerts, diagnostics) as well as longer-term benefits for the electricity grid. The combined set of proposed connected functions, such as alerts, energy-use reporting and demand response functionality, will require bi-directional communications technologies. EPA further notes that use of a CEA-2045 modular interface is one strategy a manufacturer may employ in order to align with Section 4B2 criteria.</p>
13	CF - Remote Management	<p>Section 4E - Remote Management is strongly opposed and its removal is requested. More vetting of the legal implications on warranties and other liabilities is required. There is little precedent, experience, or understanding for what constitutes a normal set of remote management features and by what means and restrictions they are employed. Section 4E relies on vagueness, but this lack of definition results in the very real potential for significant confusion and disagreement regarding what is required to meet Section 4E.</p> <p>The inclusion of the term and concept of "economical" in the second paragraph of the December 21, 2012 document and the expansion of functionalities into the specification where specific economic or cost criteria must be met is opposed. It is inappropriate for EPA to attempt to regulate the economics of smart products or to compel manufacturers to discuss collectively economic/cost/financial issues.</p>	<p>For purposes of this specification, connected devices must be interoperable with other devices via open communications protocol for critical functions including Delay Defrost and Demand Response as well as Energy Consumption Reporting and Operational Status, User Settings, and Messages. In light of the limited utility a consumer-authorized third party can offer that consumer regarding remote management of a refrigerator, EPA is not requiring Remote Management to be held to the standards of interoperability and open communications protocols (i.e., manufacturers may elect to be the exclusive provider of this functionality). This change is reflected in Section 4A: Connected Refrigerator or Refrigerator-Freezer System above and Section 4C: Open Access below. EPA sees significant opportunity for consumer convenience, energy savings and energy shifting associated with consumer authorized-third party access to remote management for other products. As such, EPA intends to consider inclusion of open access criteria for remote management on a product- by- product basis.</p> <p>EPA has retained the requirement for economical 3rd party access in Section 4A. EPA believes that at this early stage in the evolution of connected products, it is important that third parties, including utilities, remain confident that they will be able to cost-effectively leverage connected appliance capabilities in order to improve grid efficiency, reduce carbon emissions and pass associated savings on to consumers.</p>

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14	CF - Test Requirements	EPA has indicated that it will rely on a review of product literature and physical equipment inspections for the required specifications for connected that are not related to demand response. Therefore, EPA will be relying on claims by manufacturers, as opposed to testing, for some aspects of what the consumer may associate with a connected product. This strategy may be inadequate, but at a minimum, additional planning and safeguards could help mitigate potential negative consequences. To mitigate potential consumer confusion and/or dissatisfaction, EPA should be explicit on the website where connected products are identified regarding the requirements and the date that requirements are effective. EPA should further note that until a final DOE test procedure is in effect, it is only the manufacturers who are standing behind claims of connected functionality.	EPA notes that products must be subjected to third party certification testing in order to qualify as ENERGY STAR. Thus, all ENERGY STAR criteria, including connected functionality for manufacturers accessing the incentive once a test method is completed (estimated summer 2013), will be verified by a recognized third-party lab, including non-DR aspects of connected functionality.
15	ENERGY STAR Criteria Levels	EPA is encouraged to strengthen the V5.0 Draft 3 criteria once the overall market share data for 2012 is available. In addition, EPA is encouraged to consider a maximum energy use cap for refrigerators over a certain size, as in the 2012 Most Efficient criteria. An alternative approach is to subject refrigerators above a certain size to a higher percentage improvement over the Federal standard.	The levels proposed in Draft 3 have been retained, with the exception of built-in refrigerators and freezers (see Comment 1). EPA will monitor market share data as it becomes available each year to determine the impact of the specification revision on ENERGY STAR market share. In addition, EPA will continue to review and consider alternative means to reduce market share and differentiate products.
16	ENERGY STAR Criteria Levels	The 2014 DOE standards will incorporate an 84 kWh per year uniform adder for ice-making. This is a constant adder that all ice-making products must include, meaning improvements in energy efficiency will have to be achieved solely through changes to the non-ice-making portions of the product. Therefore, the ENERGY STAR criteria should be applied to the portion of the 2014 refrigerator minimum standard without the icemaker adder. This would make the reduction a true 10% for the portion of the energy consumption that a manufacturer can actually influence.	For product classes with automatic icemakers, EPA has amended the levels in the Final Draft such that ENERGY STAR levels are based on the baseline energy consumption. In doing so, EPA is harmonizing with DOE's approach, which the Agency believes is technically sound as the ENERGY STAR levels are tied to the DOE standards.
17	ENERGY STAR Criteria Levels	Icemaker ready/"kitable" models present a challenge that has yet to be addressed. This type of model is one that is equipped with the option to install an automatic icemaker. Such models are generally assigned one model number, and it is unknown whether any particular unit will have an icemaker installed or not. The icemaker could be added at the distribution center, at the point of sale, or by the consumer after purchase. The DOE final standards require manufacturers to certify energy use both with and without the icemaker (adder). However, it is unclear how EPA's proposal would treat icemaker ready/kitable models. Because manufacturers will not be able to improve upon the energy use of the icemaker, it is proposed that for these model types EPA provide that the qualification criteria be based on energy use without the icemaker. To do otherwise would penalize those models.	DOE understands the issue raised regarding icemaker ready/"kitable" models, and is planning to address this issue as part of a future rulemaking. Any approach adopted in such a rulemaking would be applicable to models under the proposed ENERGY STAR criteria.
18	ENERGY STAR Criteria Levels	EPA is urged to retain an ENERGY STAR category for freezers after 2014. Achieving ENERGY STAR status will be possible for freezers and cost-effective for consumers. Even if new DOE 2014 requirements make it extremely hard for freezers to reach a potential ENERGY STAR level, there should still be an incentive for manufacturers to strive for more energy efficient products in this category. Even if very few products are capable of reaching ENERGY STAR levels today, there may be product available in the future.	In its initial review of the Department of Energy Final Rule, EPA found payback periods, which far exceeded the 5 year target for ENERGY STAR products. Multiple stakeholders have commented on this proposal, supporting the inclusion of freezers in the ENERGY STAR specification. With this additional data, EPA is reincorporating all freezers into the ENERGY STAR criteria. The ENERGY STAR criteria for all residential and compact refrigerators have been set at 10 percent more efficient than the 2014 standard, which is consistent with all other refrigerator and freezer product categories.
19	ENERGY STAR Criteria Levels	Sunsetting all freezer categories is supported.	

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20	Effective Date	<p>EPA is urged to establish an effective date of January 2014. In their Draft 2 comments, AHAM expressed concerns on differences between the EnergyGuide label and the ENERGY STAR qualified product list. While the desire to coordinate timing with the FTC label is appreciated, it is not believed that these dates need to align perfectly and given the high market share of ENERGY STAR refrigerators an earlier effective date should be a higher priority.</p> <p>AHAM's Draft 2 comments indicate they would be able to meet a V6.0 specification by January 2014 if the specification is finalized by April 2013. EPA could set an effective date even earlier than January 2014 using either the updated test procedure or the current test procedure, with a crosswalk. Many concerns from manufacturers were regarding the parabolic equation, so the revised crosswalk should be simpler.</p>	
21	Effective Date	<p>The effective date of March 1, 2014 is opposed and a date of September 15, 2014 is proposed, which aligns with the compliance date for DOE's revised standards. The magnitude of change to the standards and test procedure in 2014 is the largest it has been since energy labeling began. In addition, while DOE issued guidance that will permit early compliance with the standards and revised test procedure (without a date limitation), it is uncertain if the FTC will permit early compliance and if it does, what the date will be. If the FTC does not permit early compliance labeling, then manufacturers will not be able to comply early with the standards because they would not be able to label early-compliant products correctly.</p>	<p>EPA has maintained the proposed March 2014 effective date. EPA agrees that the desire to coordinate timing with the Energy Guide label is an important consideration; however it is not the only consideration. With already high market share and some stakeholders including a large retailer supporting an earlier effective date, EPA believes that a March 2014 effective date will allow some additional time for harmonization between the Energy Guide label and the ENERGY STAR effective date, while still obtaining savings from the summer selling season.</p>
22	Effective Date	<p>EPA's March 1, 2014 effective date is supported for two reasons. First, overall refrigerator market share exceeded 55% in 2011 and growth is expected. Second, refrigerator sales for the stakeholder were about 77% of total sales in 2011. This high market share erodes ENERGY STAR's value. EPA is urged to collaborate with the FTC to expedite the rulemaking process for the EnergyGuide, but the preference is to keep the March 2014 effective date over harmonizing test procedures as it is believed that a short-term difference in energy test procedures will not present any confusion in the market.</p>	
23	Future Opportunities	<p>Although it is understood that the intent of the ENERGY STAR program is to save energy, refrigerators and freezers have a theoretical capability to store energy and act as a mass energy storage device. Employing these devices in that construct can theoretically be an effective tool to help the integration of renewable generation. Perhaps future versions of the ENERGY STAR specification can consider including comments and direction to engage such capability.</p>	<p>Although outside the scope of the current revision, EPA is interested in stakeholder feedback regarding savings opportunities, incremental cost and effectiveness of technical implementations associated with energy storage in refrigerators and freezers.</p>
24	Significant Digits and Rounding	<p>EPA's revision to cite the application sections of the Code of Federal Regulations is supported.</p> <p>EPA has also proposed to require that the "Maximum Annual Energy Consumption specification limit, as determined by Equation 1 shall be rounded off to the nearest kWh per year. If the equation calculation is exactly halfway between the nearest two kWh per year values, the Maximum Annual Energy Consumption shall be rounded down to the lower of these values." Identifying what "exactly half way" is confusing and is opposed. It should be enough to indicate that the Maximum Annual Energy Consumption specification limit, as determined by Equation 1 shall be rounded off to the nearest kWh per year, which is consistent with DOE's approach.</p> <p>Finally, EPA need only state that qualification for ENERGY STAR must be based on the values reported to DOE in the manufacturer's certification report and appearing on the FTC EnergyGuide label. If a clarification is needed on significant digits and rounding it should address that with DOE. Stating anything in addition to DOE's regulations may, intentionally or unintentionally, change the meaning of those regulations.</p>	<p>EPA and DOE agree that the rounding requirements should be consistent with the regulations in 10 CFR 430. Accordingly, the rounding provision in paragraph 3.C.2 of the Draft Final specification conforms to the language found in 10 CFR 430.32(a).</p>