

REF No.	Topic	Comment	Response
1	Built-In Adder	<p>Commenters support incorporating a built-in adder, also noting the proposed adders 22 kWh/year for bottom mount refrigerator-freezers and 45 kWh/year for side-by-sides do not remove the challenge, but gives more reasonable expectations for the design and manufacture of products.</p> <p>Commenters also recommends EPA reconsider not proposing adders for built-in all-refrigerators and upright auto defrost freezers. Built-in all-refrigerators and built-in freezers received unique equations for the 2014 standards. The inherent functional differences from free-standing products outlined above exist not just with regard to the built-in refrigerator-freezers for which EPA proposed an adder, but also with regard to built-in all-refrigerators and built-in freezers. While there may be a very limited number of products in the field that meet Version 5 requirements, the process of redesigning many models and producing them in high volumes is very different from having a few super efficient products appearing in the marketplace. EPA should extend the 22 kWh/year adder to built-in all-refrigerators and the 45 kWh/year adder to built-in auto defrost upright freezers. The proposed improvements for upright auto defrost freezers are the most stringent proposed by EPA. Manufacturers will be challenged to meet 2014 Federal standards. Meeting tough new ENERGY STAR levels in advance of 2014 will be extremely difficult. A 45 kWh/year adder increases the probability that a reasonable number of built-in products could be redesigned on short notice.</p>	<p>In the Draft 3 Version 5.0 specification, EPA has incorporated the amended 2014 DOE product classes and expressed the ENERGY STAR requirements as a “percent above” the federal standard. Through this draft, EPA has also recognized certain built-in products with separate product classes as opposed to using functional adders. Products are to be rated using the new DOE test procedure (Appendix A). EPA is proposing that most full-size and compact refrigerators and refrigerator-freezers use at least 10% less energy than the 2014 Federal standard. The Agency is proposing built-in products use at least 13% less energy than the 2014 standard to ensure ENERGY STAR label remains a leadership mark and that efficiency is improved beyond what is required today under Version 4.1. Given EPA's proposal to sunset freezers in 2014 (see comment response 2), built-in freezers are not separately recognized in Draft 3.</p>
2	Built-In Adder	<p>Commenter points out that DOE granted an exception for Built-in Freezers with through the door ice. DOE increased the maximum energy use allowed for this model by .36AV + 72.0 as compared to a similar model with an internal ice maker. EPA is requested to provide the same functional adder for Built-in Upright Freezers with through the door ice.</p>	<p>After considering prior comments received from stakeholders and the amended DOE standards for freezers, EPA is proposing to sunset full-size and compact freezers from the program. The Agency is open to further evaluating the opportunity to label freezers if data becomes available indicating there are new cost-effective opportunities to differentiate freezers based on energy efficiency. EPA would consider whether to establish a separate product class for built-in freezers with through the door ice, as part of that evaluation.</p>

3	Connected Adder	<p>Supports the 5% adder for smart appliances as outlined in the AHAM petition with efficiency advocates and environmental and consumer groups. The ENERGY STAR program will be a stronger and better program into the future as it recognizes the benefits of smart appliances and its efforts to jump start the development of the Smart Grid. The purpose of the 5% allowance for smart appliances is to give a percentage allowance to appliances if they meet the threshold for connectivity. Thus, if a unit as a whole achieves connected status, it should obtain the 5% allowance not just a 5% allowance for the base model of that unit. The original intent behind the 5% allowance was to be an adjustment incentive for Smart Grid enabled appliances as a whole. It is strongly recommended that the connected allowance be a percentage adjustment for the whole unit including any adders.</p>	<p>EPA has retained the proposed 5% adder for refrigerators with connected functionality.</p>
4	Connected Adder	<p>Several commenters supports integrating demand response technology into appliances as long as it does not sacrifice energy efficiency. To this end, commenters express concern regarding the 5% adder, noting that by lowering the efficiency threshold and including less efficient, and mostly less expensive, models the adder will have the unintended consequence of encouraging manufacturers to produce less efficient products to narrow the price point between their more efficient models and cheaper, less efficient units. In addition, without DR programs for residential consumers, the current 5% adder for Connected functionality will not adequately provide near-term benefits (financial, energy-related, or power-related) to the consumer. This is undesirable to consumers, utilities, and third-party efficiency rebate programs, which will suffer a penalty in reduced program energy savings with no immediate benefit. Commenter also discusses the lack of data showing "significant energy savings" that supports the inclusion of an adder. An optional "Connected" label or designation is more appropriate and would allow EPA to highlight Connected products on the Qualifying Products list.</p> <p>While EPA's efforts to find a middle ground and turn the adder into something that is "temporary" is appreciated, without a definite sun-setting clause for the credit, this is somewhat irrelevant.</p>	<p>At the core of EPA's proposal for the next refrigerators specification is a new set of strengthened energy criteria that will better recognize the most efficient refrigerators on the market. All products earning the ENERGY STAR – including models that would use a credit in order to meet the energy criteria – will continue to deliver significant, reliable and quantifiable energy savings for consumers, while preserving consumer choice of different configurations and features. The connected criteria have been structured to deliver both near-term value to consumers through new information and control of their product while helping to recognize future-oriented demand response (DR) that could provide benefit to the grid and society, as well as consumers, once supporting infrastructure is built. EPA believes the proposal will provide consumers with new functionality that can enable immediate energy-savings and convenience opportunities (e.g., alerts to their smart phone via an existing home area network). In the Draft 3, the Agency has retained the proposed allowance that is designed to help “jump start” the market for appliances with demand response capability.</p>

5	Connected Criteria	<p>In Section 4, the first paragraph provides an overview, but additional language is needed for clarification on the discussion for the system under consideration. The following is proposed to include the following in order to define the system boundaries: "The connected refrigerator is an appliance that provides all the necessary hardware and software for communications."</p>	<p>In the Draft 3 V5.0 specification, EPA has revised the language in section 4, leveraging joint recommendations from a group of utilities and appliance manufacturers. EPA is proposing the Connected R/F System include the base refrigerator or refrigerator-freezer plus all elements (hardware, software) required to enable communication in response to consumer authorized energy-related commands.</p>
6	Connected Criteria	<p>EPA proposes to title Section 4A "Home Energy Management (HEM) Functionality." This title is confusing. When defining system boundaries as above, it should not be the intent to include home energy management functionality in this standard, only the ability to connect and communicate with a home energy manager external to the system under consideration. A more accurate title might be "Connectivity to Support Home Energy Management."</p>	<p>The revised connected criteria in the Draft 3 V5.0 specification does not use the title "Home Energy Management (HEM) Functionality" and no longer distinguishes "HEM" into a separate section. EPA appreciates stakeholders' input that has help to shape a set of minimum requirements (i.e., communication, energy-related functionality such as, alerts and energy reporting, and demand response) to define connected functionality for the purposes of the ENERGY STAR program.</p>
7	Connected Criteria	<p>In Section 4A1, EPA proposes language stating "the data shall represent energy consumed by the product in watt-hours for intervals of 15 minutes or less." The clarification regarding when updates should occur is supported and the following additional language is proposed: "The data shall represent energy consumed by the product in watt-hours for update intervals of 15 minutes or less per manufacturer specifications." Manufacturers can best determine the calculations based on the frequency of the measurement.</p> <p>For further clarification, power feedback can also be provided on the product itself without transmitting and this provides flexibility to manufacturers. Transmission should therefore not be a requirement of the specification.</p>	<p>EPA agrees that at this nascent stage it should be permissible to provide greater flexibility as long as the data that is transmitted is representative of energy consumption. Therefore, in the Draft 3 V5.0 specification, the Agency continues to specify transmission of representative energy consumption data, but has added implementation flexibility consistent with this stakeholder comment.</p>

<p>8</p>	<p>Connected Criteria</p>	<p>In Section 4B EPA proposes to include two 4-hour peak load periods for the delay defrost capability. The second peak is not necessary as the product provides the capability to move the peak time as needed. A second peak doubles the restricted time when defrost can occur in a 24-hour period and eliminates one-third of a day that is available to defrost. A larger window for defrost provides for more randomization and better grid response. Manufacturers have indicated four hours per day is the maximum defrost that should be automatically deferred without impacting performance and reliability of the product. Two peaks create an eight hour delay problem - one third of the day would be walled-off from defrost. This is an unacceptable result. If a more customized approach is desired for each region, it would be preferable for the utility to incentivize consumers to make adjustments to their local needs through real time pricing structures.</p> <p>This section also needs additional clarification on the interface between Section B and Section C. The delay defrost capability identified in Section B must be disabled in order for the product to respond to a signal as identified in Section C for demand response. The specification should provide explanation regarding interaction between these two capabilities. If Section B is not disabled when a signal comes in per Section C, then there could potentially be twelve hours per day unavailable for defrost.</p> <p>The 24 hour clock requirement and peak shifting input interfaces is driving unexpected costs into the product (clock, battery, etc.). If some level of connectivity is assumed, the system can read time after the outage. This assumed level of connectivity should be clarified in the specification.</p>	<p>In the Draft 3 V5.0 specification EPA is proposing a single 4-hour deferral period that is seasonal and thus aligns with typical 6am to 10am Winter peaking from November 1 through April 30 and with typical 3pm to 7pm Summer peaking from May 1 through October 31. This change is intended to further balance manufacturers' concern about performance and reliability issues that could result from requiring a refrigerator's Delay Defrost capability to include two 4-hour deferral periods per day, with grid needs.</p> <p>EPA has also revised the Delay Defrost criteria to apply only to products that are interconnected (i.e., communicating with external devices/services). EPA expects that this change will reduce the incremental product cost by encouraging time synchronization with external sources such that clock display, (time input) user interface and backup requirements are reduced. Consumer experience will also be enhanced in that there will be no need to set or maintain the time.</p>
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9	Connected Criteria	<p>In Section C1a, EPA proposes language to remove the option to shift ice maker energy. The original intent for the 13% energy reduction was to provide an additional option to allow product without ice-making to meet the requirements of the specification, not to be a replacement for the delay of ice-making. Prior studies have shown that the average energy consumption to make ice fully aligns with this 13%, but the amount varies from household to household and product to product; therefore, EPA is strongly urged to add ice-making back into the specification as is the original intent of the petition and how the Pacific Northwest National Lab study in this area assumed would occur.</p>	<p>In the Draft 3 V5.0 specification EPA has reinstated deferral of ice making as an option for Delay Appliance Load response, recognizing this load could be a reasonable target for load shifting. In addition to either deferring ice-making or reducing power draw by at least 13%, the refrigerator would also be required to shift defrost outside of the delay period. Any changes to the connected test procedure associated with the addition of the ice-maker deferral load will be addressed as part of the test procedure development process.</p>
10	Connected Criteria	<p>In Section C1b, EPA proposes to include language that "the product is not required to respond if the product is defrosting when the signal is received and the signal requests a load reduction start time that is less than 10 minutes from the time the signal is received." This sentence is confusing and needs clarification.</p> <p>The exception to ensure that a defrost cycle is not interrupted by a delay load signal in the middle of a defrost cycle is supported. However, the duration of a defrost cycle varies depending on the type of refrigerator and on the condition of the evaporator coils. Therefore, the exception cannot specify a time to ensure a defrost cycle is not interrupted by a delay load signal. It should specify the state of the defrost cycle. Changes to the specification have been made recommending an alternative way to phrase this exception (Attachment I). The following language is proposed: "the product is not required to respond to a delay load signal if the signal requests the delay load period to begin while the product is defrosting."</p>	<p>EPA agrees that the commenter's recommended language offers greater clarity and has incorporated it into the Draft 3 specification. Additionally, EPA is proposing that if a load signal requests the delay load period to begin while the product is in an ice-maker harvest/refill cycle, it is exempted from providing a deferral of ice-making or a 13% power draw reduction, but is not exempted from shifting defrost outside of the delay period.</p>

11	Connected Criteria	<p>In Section D1, it is proposed that "Connected Product Criteria" should utilize standards that have been reviewed under the Smart Grid Interoperability Panel (SGIP) process and judged acceptable by the manufacturer. Other open, non-proprietary standard development organizations should also be utilized. The SGIP is an open and collaborative process among major stakeholders for the smart grid coordinated by the National Institute for Standards and Technology (NIST) and includes a rigorous process for review. Standards that do not meet this level of review through an open process should not be included in this specification. In addition, additional text to 4D(1) is proposed to clarify that in the case of the modular communications, this recommendation applies only to the communications functionality external to the system, as defined in Section 4.0, and not to the interface between a communications module and its associated host appliance.</p>	<p>In the Draft 3 V5.0 specification, the connected communication criteria have been revised to require use of communication standards associated with the SGIP process, adopted by the American National Standards Institute (ANSI) or by a well-established international standards development organization (SDO).</p>
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<p>12</p>	<p>Connected Criteria</p>	<p>EPA proposes, in Section D1, to provide an exception to providing a modular interface for demand response functionality which is confusing and the intent for the exception is not clear. By providing the exception, the language in the specification seems to indicate that if the interface is compliant with any standard from the listed organizations (NIST, ANSI, ISO) the module itself is not necessary. This approach is not consistent with the intent to provide the consumer with a product that is operational upon receipt. Such an approach is very limiting and may not enable communications with a HEM, thus disabling sections 4A &amp; 4D and potentially impact 4B based on the architecture selected by the manufacturer.</p> <p>The use of open protocols has always been supported as have the use of standards developed through the SGIP process other standards bodies provided in the specification is also welcomed. The use of U-SNAP (currently being integrated into CEA 2045) module for application to appliance products has been evaluated and the industry has declined to use the product for reasons related to consumer confusion and additional costs (which would include societal costs if the utility provides the module). AHAM has a paper which was completed in 2010 which assesses communications standards.</p> <p>The CEA Modular communications Interface should be approved by the SGIP to ensure interoperability as would be required for all other standards. EPA should not take on the role and responsibilities of the SGIP and its collective expertise in this area.</p>	<p>See comment response 11. Additionally, EPA has developed revised criteria in section 4A (Connected Refrigerator-Freezer System) and section 4B (Communications) based on recommendations made jointly by a group of appliance manufacturers and utilities. The Draft 3 specification includes a new diagram designed to help illustrate the boundaries of a Connected R/F system, which includes all elements necessary to enable communications with external devices, services or applications in response to energy related commands. EPA has further clarified that a communication module is part of the Connected R/F System and, as such, must be included in the sale of the product.</p>
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13	Connected Criteria	<p>The enhancements in this revision that clarify that the TALR and DAL are merely examples (of minimum functional requirements) and that the degree of energy reduction and durations listed are also examples of minimum capability requirements is appreciated.</p> <p>The use of language that makes it clear to appliance makers that DR programs and the fundamental grid needs from which they are derived, are both diverse and evolving, and that the ability to receive and respond to a wide range of indicators of grid needs will be beneficial continues to be encouraged.</p> <p>As an example of additional signals that connected appliances could respond to, one suggestion is price, or more specifically a “relative energy price”. This would enable appliances to be responsive in TOU, CPP and other rate-based programs, in addition to the direct load control programs that might be supported by TALR and DAL.</p>	<p>The two minimum demand response capabilities addressed in Version 5.0, TALR and DAL, were initially suggested by manufacturers and stakeholders as core responses that could define a connected refrigerator. EPA agrees with the importance of price signals, most notably for products where energy use may be effectively scheduled or deferred. EPA plans to consider how price signals might be addressed in future revisions to the ENERGY STAR refrigerator specification. EPA and DOE are interested in stakeholders' feedback on this opportunity including the differences between price based and reliability based signals and the importance of including additional test signals in the ENERGY STAR test method.</p>
14	Connected Criteria	<p>It is believed that the inclusion of this timer-based “delay defrost capability” can be highly beneficial. As written, it allows consumers to align the settings with their local TOU schedules, while at the same time providing for out-of-the-box default settings designed to provide immediate grid benefits in all regions.</p> <p>The additions in Draft 2 of both morning (winter peaking) and evening (summer peaking) delay periods is regarded as an advancement of the criteria. This should support appropriate device behavior in diverse regions and enhanced grid benefit in all regions as a result. In addition, alternative lines for 248-251 are suggested (to define a single overnight window for defrosting) as an advancement, and is neutral to the two approaches.</p>	<p>See comment response 8. EPA believes that the revised criteria in Draft 3 will provide enhanced grid benefits while avoiding potential refrigerator performance and reliability concerns.</p>

15	Connected Criteria	<p>The rationale for the listing of “remote management” in the context of connected appliance criteria for EPA/ENERGY STAR is not understood. It would seem that appliance makers have always been able to freely choose to offer (or not offer) remote management capability, and since there is no apparent energy efficiency or demand response effect involved, it seems out of place to list it as a requirement here.</p>	<p>The energy saving value of remote management capability varies with product type. Remote management of products with highly elective energy usage such as room A/C or water heaters will likely provide greater benefit than remote management of always-on appliances such as refrigerators. However, EPA recognizes that there are certain refrigerator models that include an energy saving holiday/vacation mode, for which remote management may be well suited.</p>
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16	Connected Criteria	<p>A single uniform communication specification, such that the communications capabilities described in sub-section (b), beginning line 354, may apply to both HEM and DR uses, such that lines 348 to 352 are eliminated is recommended. In such a case, the provision for “open access” as described in sub-section (c) may still apply, in order to allow for the exchange of vendor-specific information for which there is no standard. The rationale for this recommendation is twofold:</p> <p>First, both sections already offer manufacturers the choices of:</p> <ol style="list-style-type: none"> <li>1. Built-in communication technology</li> <li>2. Modular communication, shipped with the product</li> <li>3. Modular communication, provided at the time of sale</li> </ol> <p>Sub-section (b) only adds more options for manufacturers, without removing any of the three above, and is therefore less restrictive. The added options include the use of an open-standard modular interface.</p> <p>Second, it is recognized that in any case, consumers do not get HEM functionality, without the purchase of additional equipment. In other words, requiring that a communication technology be included in the box at the time of purchase is not sufficient to provide HEM functionality. It provides a communication conduit, but it is a conduit that leads nowhere unless or until a consumer makes an additional purchase. Given this, it would seem that the additional option provided in section b (a modular interface based on an open standard) may be of interest to some manufacturers for HEMS purposes also, and could serve to increase the likelihood of consumer’s actually acquiring HEM functionality as a result of improved network flexibility, and compatibility with existing or third party networks such as home automation, home entertainment, security systems.</p>	<p>In Draft 3, EPA is proposing a minimum set of communication requirements that are common to all products with connected functionality, and are applicable to both HEM and DR. The proposed communications criteria allow for built-in, proprietary modular and standards-based modular communications. The Draft 3 also requires modules, whether proprietary or standards-based, to either ship with the appliance, be provided to the consumer at the time of sale, or in a reasonable amount of time after the sale. EPA believes this will provide a more level playing field and help ensure that connected appliances include a matched module that enables full connected functionality.</p>
17	Connected Criteria	<p>Recommends that the communication option on lines 358-361 be listed alongside the other options, rather than being identified as an “exception”.</p>	<p>See comment response 16.</p>

18	Connected Criteria	<p>Applauds the attention EPA has provided to the value of standards in regard to communication interfaces. The employment of standards generally fosters interoperability and market competition, leading to greater satisfaction and value for consumers. The present draft (beginning at line 373) recommends that all layers of the communication systems employ standards. However it only requires standards when the manufacturer chooses to use a standard modular communication interface. Commenter recommends the same standards requirements apply to the communication related to participation in demand response programs, regardless of which option the appliance maker chooses (e.g. built-in, in the box, provided at the time of purchase).</p>	See comment response 11.
19	Connected Criteria	<p>Notes that at the present time, eligibility for some utility demand response programs is dependent on the ability to verify that the end-device provided a certain response. In view of this, we would suggest language or notation that makes it clear to appliance makers that such verification may be required. There are presently two types of information identified in the HEM section of the document that would be useful for this purpose: energy consumption information and demand response status. With consumer approval, these quantities could be made available along with the DR communications, thereby expanding the number and type of DR programs for which a product may be eligible.</p> <p>Supports the consumer privacy and control principles that are incorporated into the Draft, and believes that the optional provisioning of verification information would expand consumer opportunity while remaining consistent with privacy principles. Standards exist for exchange of simple metering and status information sufficient for verification of DR program participation.</p> <p>Note: If HEM and DR communication requirements are combined as recommended previously, this comment is rendered moot.</p>	<p>In the Draft 3 Version 5.0 specification EPA has combined the two sections that previously specified home energy management (HEM) and DR functionality separately, to better reflect that these functionalities and the data associated with them may not separate functions. In consideration of this comment, in Section 4D, EPA has revised the language to state that transmitted energy consumption data can enable feedback to consumers as well as consumer authorized energy use reporting to 3rd parties.</p>

20	Connected Criteria	<p>As an extension to the previous comment, product manufacturers should be aware that eligibility for some demand response programs may require reporting of customer overrides. With consumer approval, override status could be made available as an element of the “demand response status” identified in lines 197 and 198. Furthermore, customers could have the option of turning off override capability if they so choose to agree up-front with their utility, third party DR aggregator, or other provider to not exercise this capability (e.g., in exchange for greater incentive levels or to qualify for programs/rewards requiring such).</p>	<p>EPA believes it is important that customers retain ultimate control of their appliances. Thus, the Draft 3 Version 5 specification continues to include criteria mandating consumers have the ability to override the appliance's DR response, before or during a DR event. In addition to the override capability -- although not required -- the criteria does not prevent a manufacturer from also including a consumer setting that disables/enables override-ability.</p> <p>While the proposed criteria do not require that consumer overrides be reported, products are required to report on their energy use. EPA believes this reporting could enable responses to DR signals to be verified and consumer overrides to be detected.</p>
21	Connected Criteria	<p>Commenter believes that 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 following stated objectives of the ENERGY STAR "connected" Program Requirements of near term value, consumer-centric options, and ease of use with little or no installation steps needed.</p> <p>In Section 4A, the statement "A. Home Energy Management (HEM) Functionality A Connected refrigerator, refrigerator-freezer, or freezer shall have the following capabilities:" can be modified to allow optional participation. Bi-directionality requires a built-in transmitter, which can use a significant amount of standby or 'phantom' power. Moreover, it will also require at least one other transceiver unit, which also consumes significant standby or 'phantom' power. Therefore, it is recommended that the use of bi-directional communication or HEM be classified as optional and not mandatory for user privacy and 'phantom' power consumption reasons.</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.</p>

22	Connected Criteria	<p>In Section 4B, EPA proposes that the delay defrost capability of a connected refrigerator, freezer, or refrigerator-freezer with automatic defrost now cover, at a minimum, two 4-hour peak load periods: the 3 p.m. - 7 p.m. period specified in Draft 1, and a new period from 6 a.m. - 10 a.m. Two 4-hour peak load periods wall off one-third of the day, potentially adversely affecting product performance and reliability. From a larger policy perspective, requiring a second automatic peak load deferral period would further shift the burden of the electric grid load management onto household appliances and further dis-incentive electric utilities from deploying a truly smart grid, one with interactive consumer features and behavior-modifying incentives such as time-of-use or other dynamic pricing. Rather than requiring automatic peak load shifting, EPA should instead ensure that connected refrigerator-freezers have the capability to respond to peak load signals from utilities. That, together with consumer demand to take advantage of the smart capabilities of new refrigerators and other appliances will help drive built-out of the smart grid and opportunities for true energy savings, not just load-shifting.</p>	<p>See comment response 8. Additionally, EPA believes that automatic peak period avoidance and signals based demand response functions are complementaty features that have the potential for providing both near term benefits as well as expanded benefits and functionality once appliance DR programs are widely deployed.</p>
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23	Connected Criteria	<p>The current Draft 2 specification requires that a Connected refrigerator or freezer responding to a DR signal be able to provide at least one response (DAL or TALR) within a 24-hour period. However, EPA notes that this means that the unit does not need to respond to additional DR signals if called within a rolling 24-hour period, even if the unit is capable of responding (i.e. within the allowable temperature range). Our concern is that manufacturers may interpret this to mean that their unit does not need to respond to additional DR signals, and could design their units to respond to only one DR signal in a 24-hour period.</p> <p>EPA is asked to clarify and tighten this requirement, and require that units respond to, at a minimum, one DR signal within 24 hours, but shall not limit the ability to respond to more, so long as functionality and safety are not jeopardized. Allowing units to ignore additional signals within a 24-hour period is unnecessary and significantly compromises the value of DR functionality.</p> <p>Unless it can be proved that responding to subsequent DR signals within a 24-hour period is impossible, or significantly compromises product performance, we recommend that the EPA strengthen and clarify the current language, such as in the following: "The product shall be able to provide, at a minimum, one Delay Appliance Load/Temporary Appliance Load Reduction Response in a rolling 24-hour period, but shall not limit ability to respond to more, so long as functionality/safety is not jeopardized."</p>	<p>EPA has retained language specifying that a refrigerator with connected functionality provide at least one Delay Appliance Load (DAL) and one Temporary Appliance Load Reduction (TALR) response in a rolling 24-hour period. EPA's criteria does not preclude products from providing this additional functionality that stakeholders are interested in. EPA's criteria establishes minimum requirements. Manufacturers, at their discretion, can develop products that exceed this, i.e., responding more than once in a rolling 24-hour period. In future specification revision cycles, EPA could consider opportunities to further improve and strengthen the initial Version 5.0 connected DR criteria.</p>
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24	Connected Criteria	<p>The Draft 2 specification for refrigerators and freezers does not currently specify that the Connected criteria for the product be active "out of the box", default on. It only specifies that the product must "ship with default settings" in regards to DAL and TALR DR responses. Commenter suggests this requirement be extended to require that ENERGY STAR rated refrigerators and freezers "ship with default settings active". In addition, this requirement should cover call Connected criteria, not only DR functionality. This will enable the connected functionality to operate and accrue benefits without any necessary consumer action.</p>	<p>EPA has developed the connected criteria to ensure that products with this new functionality can offer tangible benefits both to the consumer and to the grid once they are interconnected. However, EPA believes that the consumer must retain fundamental control over the interconnection of the product as well as how it responds to DR signals. In the Draft 3 specification, delay defrost capability is required to be active by default once the product is interconnected. In contrast, for Demand Response, the specification mandates default responses in response to "consumer-authorized" signals. For example, under a DR program, consumer authorization could take the form of a DR service agreement between the utility and the customer. EPA believes that, especially at this early stage of appliance DR, consumer authorization plays an important role in providing consumers with piece of mind that they have ultimate control over their appliances' DR responses.</p>
25	Connected Criteria	<p>With respect to labeling and packaging of connected appliances, commenter believes more clarity is needed to distinguish what a "connected" appliance represents in order to alleviate confusion similar to what consumers encountered during the transition to high definition (HD) television. Suggests defining a DR-enabled appliance as one that requires no additional consumer costs related to hardware, software, or services to participate in any utility sponsored DR program. Commenter also recognize that, during this transitional period, appliances will most likely be shipped DR-ready, requiring additional investments in order to reach DR-enabled status. It is critical that a level of clarity is provided so consumers, manufacturers, and utilities all fully understand what "connected" means.</p>	<p>EPA is concerned that further segmenting refrigerators with connected functionality as "DR-ready" or "DR-enabled" could be confusing to consumers. The Draft 3 specification recognizes options that meet the stakeholder definition of DR-enabled (sections 4B2c and 4B2d). Additionally, the Agency is requiring that if additional modules, devices, services or infrastructure are required to activate the product's communication capabilities, labels or other forms of consumer notifications be displayed at point of purchase and in product literature (i.e., a use and care manual).</p>

26	Connected Criteria	<p>Regarding open communication to appliances, commenter recommends that all layers of the communications stack, including the application layer, should be standards-based and achieved solely within the customer's premises. The existing draft language and associated refrigerator/freezer "system boundary" allows for an architecture where proprietary commands might be translated via an internet cloud rather than within the customers' premises. The ENERGY STAR specification language should be modified to include unequivocal language that disallows for architectures that do not provide an open, non-proprietary means for achieving grid connectedness with the appliance within the bounds of the customer's premises.</p>	<p>Discussions with both appliance manufacturer and utility stakeholders have indicated there are a number of different approaches for achieving grid connectivity. Further collaboration between manufacturers and utilities will be necessary to best shape how connectivity evolves. At this formative stage, EPA believes it is important that ENERGY STAR products listed as connected preserve flexibility for consumers and utilities by being able to, at a minimum, receive and directly respond to open standards-based signals from a utility or another 3rd party service provider, without having to depend on a service supplied by the product's manufacturer via the Internet/cloud. This both expands consumer choice and ensures there can be competition in the marketplace for providing demand response (DR) and related energy services for connected products. To this end, EPA proposes in section 4A that a Connected R/F System, at a minimum, be capable of receiving and directly responding to open standards-based energy related commands on the consumer's site. EPA notes this does not prevent an appliance manufacturer from also providing a cloud-based-solution for DR.</p>
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27	Connected Criteria	<p>The current Draft 2 and Draft Test Method to validate DR for residential refrigerators and freezers, allow for consumer response exceptions to the TALR test. Although these consumer response exceptions may drive refrigerator power demand and energy consumption, they do not directly determine whether a residential refrigerator or freezer will be able to respond to a DR event, and further do not address the condition of a refrigerator or freezer prior to the event being initiated. These exceptions are only proxies for the ability of the unit to respond to a DR signal without compromising food safety. The interior temperature will both determine food safety and the ability of the unit to respond to a DR signal, and would provide a more accurate exception.</p>	<p>In the specification and test method development process, EPA and DOE investigated a number of different approaches for expressing exceptions to the DR requirements. Although internal temperature may be a key factor in the ability of a unit to respond to a DR signal, the overarching requirement for the program is to ensure that consumer expectations continue to be met during DR events. Therefore, EPA has maintained the consumer response exceptions in Draft 3 that specify products do not need to respond to TALR request if there is a consumer-initiated function such as a door opening or ice/water dispensing. Additionally, section 4 of the specification requires that a refrigerator must continue to meet manufacturer's internal performance guidelines, i.e., those for food preservation.</p> <p>EPA recognizes that maintenance of minimal acceptable food compartment temperatures may be a more direct and measurable criterion for determining if the refrigerator is able to respond. The Agency welcomes further stakeholder input on this concept for consideration in a future specification revision cycle.</p>
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28	Connected Criteria	<p>As currently written, the Draft 2 specification and test procedure requires that a Connected product "reduce its average energy consumption" during both the DAL and TALR test. From a utility load management perspective, there is a significant and important difference between the average unit demand over a time period, and the actual demand profile over the same period. The response pattern, length of time to respond, and maximum and minimum demand over the time period, will all matter when attempting to estimate and plan the impact from a DR event. For example, during the DAL test as currently written, a unit that provides a sustained power reduction of 13% over the 4-hour test period, will provide the same test results as a unit that reduces power by 26% for only 2 hours of the test. But, the actual demand benefits of the two units are quite different, and a utility or other power provider would not be able to reasonably manage load during an event if all units called responded like the second unit in the above example. For comparison, the power demand during the test period (both DAL and TALR) could be compared to the baseline power demand measured during the 24-hr DOE residential refrigerator test procedure.</p> <p>Redefining the specification and test procedure in this way may require reexamining whether the current power reduction requirements are realistic and appropriate (13% for 4 hours for DAL, 50% for 10 minutes for TALR). We suggest that this issue be raised for public comment.</p>	<p>The Draft 3 Version 5.0 document specifies reductions in refrigerators' average power draw that are based on those recommended by appliance manufacturers and energy efficiency groups as achievable targets. EPA also notes that the revised language in the Draft 3 specification clarifies that the reductions in power draw are relative to the average power draw drawn during an average load over a 24-hour period as defined by the Baseline Test in the Test Method to Validate Demand Response. The intent of the criteria is to reduce the average energy consumption over a defined period of time by a minimum amount, relative to the energy consumed during the same defined period of time as measured in the Baseline Test as included in the Test Method to Validate Demand Response.</p> <p>EPA, however, recognizes utilities' concern with having a large number of loads respond to a DR signal with the same demand profile or rebound simultaneously after a delay period concludes. EPA thus encourages stakeholders to comment on the potential for this to occur, whether additional criteria are needed to address this issue, and how such criteria, if needed, might be structured.</p>
29	Connected Criteria	<p>EPA assumes that delaying defrost will be a necessary part of DAL and TALR response. This assumption may not be true for all manufacturers and products. We suggest that EPA revisit this assumption.</p>	<p>The DAL response proposed in Draft 3 V5.0 would require a refrigerator to shift its defrost outside of the delay period and either shift ice maker cycles beyond the delay period or reduce its average power draw by 13% over that period relative to the specified baseline.</p> <p>For a TALR response, EPA believes that it is reasonable to expect that a refrigerator will not be able to reduce its energy consumption by the requisite minimum level (at least 50%) if it defrosts during the TALR delay period. However, the Agency has not explicitly assumed that the product will need to delay a defrost cycle that would have otherwise occurred, to comply with the proposed TALR requirements.</p>

30	Definitions	<p>The proposed definition for "built-in refrigerator/refrigerator-freezer/freezer" is the same as the DOE definition found in 10 C.F.R. 430.2 and is supported. However, EPA should cite to that definition, as well as all other definitions that are identical to DOE's definitions, instead of copying and pasting it into the specification. Citation to definitions is the best way to ensure consistency and harmonization with DOE definitions at all times - it ensure that as DOE definitions change, ENERGY STAR definitions also change to mirror them. To achieve consistency, the relevant definitions must be identical to each other at all times. Without such consistency and uniformity there will be significant confusion for manufacturers and for consumers.</p>	<p>In order to provide all partners with a clear understanding of the program's requirements, EPA lists relevant definitions in section 1. As noted in the specification, unless otherwise specified, the refrigerator and freezer definitions are identical with the definitions in the DOE test procedures at 10 CFR 430, Subpart B, Appendix A1 and B1 or in 10 CFR 430.2.</p>
31	Effective Date	<p>EPA proposes an effective date for V5.0 of January 1, 2013. The effective date must allow for the statutorily required 270 day lead in period prior to the effective date of this significant revision. That lead-in period is critical to allow manufacturers enough time to design, manufacture, market, and distribute products that meet the new specification. The lead-in period is especially important for the ENERGY STAR version that will introduce smart capabilities, where significant customer and consumer education will be required.</p>	<p>EPA is proposing a revised effective date of March 1, 2014, for the Version 5.0 specification. In light of the extended timeline for completing the Version 5.0 revision and the new DOE test procedure and 2014 Federal standards for residential refrigerators and refrigerator-freezers, EPA is proposing a revised effective date of March 1, 2014, for the Version 5.0 specification. This timing avoids the need for two ENERGY STAR specification changes for residential refrigerators in the next two years and aligns with the availability of DOE's amended test procedure that manufacturers have told EPA they plan to use for new models introduced in 2014.</p>
32	Energy Use Criteria	<p>Commenter opposes the proposed hyperbolic tangent approach, stating it is a costly and unnecessary change from the current approach under which EPA sets maximum annual energy use based on a percentage more efficient than the federal standards and disfavors some units that comply with DOE standards. DOE, through its lengthy, thorough, and long-existing rulemaking process for appliance efficiency standards, has established separate product classes and standards for good reasons. As has been previously commented, treating larger models differently than other products will limit consumer choice and is opposed.</p> <p>Commenter recommends EPA return to a percentage increase approach, which will minimize the already daunting cumulative regulatory burden and uncertainty being placed on refrigerator/freezers.</p>	<p>EPA is incorporating the latest DOE product classes and expressing the ENERGY STAR requirements as a "percent above" the federal standard. Products are to be rated using the new DOE test procedure (Appendix A). With this revised proposal, EPA's intent is to provide meaningful savings for consumers seeking ENERGY STAR refrigerators while also considering the potential efficiency impacts associated with the proposed 5% allowance for products with connected functionality, and to ensure a selection of labeled products from various manufacturers in each of the configurations that consumers seek.</p>

33	Future Specifications	<p>EPA should use a separate specification revision process to revise the qualification criteria to account for the 2014 standard levels. There are, however, significant timing issues that must be addressed. The magnitude of the change to the standards and test procedure in 2014 is the biggest it has been since energy labeling began and both manufacturers and trade partners will be involved. The required change is very difficult to accomplish during the peak buying season because of production schedules and promotions, as well as other factors. The fact that the transition will occur during this period (September 2014), only increases the magnitude of the change.</p> <p>In an attempt to minimize unnecessary and costly duplicative requirements, permission is being sought from DOE to allow for the option of testing and rating models under the new test procedures and standards beginning on or after January 1, 2014. If DOE grants the request for early compliance, EPA should facilitate the ability to comply early with the Version 6.0 levels and closely coordinate this early compliance with the DOE's and the FTC's efforts in this area. However, early compliance with ENERGY STAR specifications will not be enough in this case. In order to design, manufacture, and market products by January 1, 2014, that are capable of meeting the revised standards, and also the ENERGY STAR requirements, manufacturers will need to know what the V6.0 qualification criteria will be prior to the January 1, 2014, date. EPA is requested to publish a final specification V6.0 by about April 2013, which gives EPA, DOE, and stakeholders one full year to work out the details of that specification. EPA and DOE are encouraged to exercise their statutory discretion to provide more lead time to help mitigate the manufacturer burden by providing extra lead time for the V6.0 specification.</p>	<p>As a result of the extended schedule for completing the Version 5.0 revision and in light of the new DOE test procedure and 2014 federal standards for R/F products, based on conversations with stakeholders in the Draft 3, EPA is proposing a single specification change in 2014. Under the Draft 2 V5.0 specification, products would need to be rated using the amended DOE refrigerator test procedure (Appendix A).</p> <p>EPA is proposing a revised effective date of March 1, 2014, for the V5.0 specification. This schedule avoids the need for two ENERGY STAR specification changes for residential refrigerators in the next two years and aligns with the availability of DOE's amended test procedure that manufacturers have told EPA they plan to use for new models introduced in 2014.</p> <p>DOE issued guidance on June 29, 2012, regarding the use of an amended test procedure prior to the compliance date of an amended energy conservation standard. This guidance is applicable to all covered products, including R/F products addressed by these prospective specifications, meaning that manufacturers are permitted by DOE's regulations to use the Appendix A and Appendix B test procedures to test and rate products prior to the September 15, 2014, compliance date. This allowance for early use of a DOE test procedure would also prospectively allow for early use of these amended test procedures to comply with FTC labeling rules and for testing to determine compliance with prospective V6.0 ENERGY STAR specifications, if permitted by those respective programs.</p>
34	Future Specifications	<p>Although the intent of the ENERGY STAR program is to save energy, the Refrigerator and Freezer has a theoretical capability to store energy and therefore act as a mass energy storage device. Employing these devices in this way can theoretically be an effective tool to help the integration of renewable energy generation. Perhaps future versions of the ENERGY STAR specification can consider including comments and direction to engage such capability.</p>	<p>EPA could consider this for future specifications and encourages the commenter to share available data on this opportunity.</p>

35	Significant Digits and Rounding	<p>The significant digit and rounding procedures should be harmonized with DOE's regulatory requirements. But harmonization is not enough - EPA's requirements must be identical to DOE's requirements. EPA should simply cite to the requirements in 10 C.F.R. 430.23 rather than to restate them in the specification. Manufacturers cannot legally make energy representations based on anything other than DOE's applicable test procedures and regulations. Accordingly, EPA only needs to state that qualification must be based on the values reported to DOE in the manufacturer's certification report and appearing on the EnergyGuide label. That approach will provide clarity and consistency for regulated parties and also for consumers who will see the same values in multiple places. If clarification on significant digits and rounding is required, DOE should be consulted, and DOE should issue guidance if guidance is necessary after consulting with stakeholders. EPA cannot unilaterally clarify DOE's regulations through an ENERGY STAR specification. Stating anything in addition to DOE's regulations may, intentionally or unintentionally, change the meaning of those regulations.</p> <p>There may be some confusion about the concept outlined in 3.C.d. In order to address that confusion, where it appears EPA is restating DOE's regulations in different language. If EPA wishes to specifically highlight the requirements regarding the nearest significant digit, it should cite the DOE regulation and then, if it deems necessary, follow it by quoting exactly DOE's language to provide additional clarity.</p>	EPA has revised the significant digits and rounding requirements to cite the applicable sections of the Code of Federal Regulations (CFR).
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