Rômulo Pontual
Executive Vice President
and Chief Technology Officer

DIRECTV

July 10, 2013

Ms. Katharine Kaplan
ENERGY STAR Set-Top Box Program
U.S. Environmental Protection Agency
1310 L Street, NW
Washington, DC

Dear Katharine,

I am writing to urge the EPA to adopt the Advanced Video Processing and High Definition Resolution allowances from EPA's "Draft 1" proposal for the Final ENERGY STAR® Version 4.1 Set-top Box specification. DIRECTV supports the agency's goal of increasing set top box energy efficiency, and believes that its most recent Genie™ whole home HD-DVR and client boxes make remarkable advancements in this area. In a typical three room installation, these newest Genie boxes use 25% less energy overall than their predecessors, requiring a world-leading 83 kWh/yr per TV. However, without the Advanced Video Processing and High Definition Resolution allowances, these DIRECTV set-top boxes would not be considered compliant with Version 4.1 and DIRECTV would no longer be able to participate in the ENERGY STAR STB product program after spring of 2014.

DIRECTV highly values its partnership with ENERGY STAR, and has made a sustained and significant investment in improving its set-top boxes' energy efficiency since 2007 when EPA first announced its intention to restart the ENERGY STAR STB program. We are proud to have placed the ENERGY STAR logo on the front panels of more than 40 million receivers so far, and believe that the millions of daily impressions from our use of the logo in our Power Savings user interface screens reflect positively on both ENERGY STAR and DIRECTV. The quote from our joint press release in March ("EPA Names DIRECTV 2013 ENERGY STAR Partner of the Year") bears repeating here:

> *"Environmental stewardship continues to be an important aspect of our business and the actions we all take to conserve energy and reduce waste have an immediate impact," said Romulo Pontual, executive vice president and CTO of DIRECTV. "When they see the ENERGY STAR mark on their DIRECTV receivers, our customers recognize that they are saving energy and money while continuing to enjoy their high quality, feature rich DIRECTV service."*

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I am confident that EPA similarly values its partnership with DIRECTV. We appreciate having been honored with Excellence awards in 2010- 2012, and were so thrilled with this year's Partner of the Year award that our Chairman President & CEO Mike White, accompanied me to Washington DC to meet you and Beth Craig and accept the award.

My engineering team has taken great pride in EPA's recognition of how our innovative Genie system delivers substantial energy savings both through its server-client architecture as well as through its "receiver-less" connections to Smart TVs using industry standard RVU technology. Back in September 2011 when the Version 3 STB Specification took effect, development of DIRECTV's "Version 4 generation" products for 2013 was already well underway. DIRECTV engineering, in collaboration with our hardware manufacturing partners, set aggressive energy savings goals for these follow-ons to the original HR34 Genie server and C31 client. First shown publically at International CES in January 2013, these newest products are currently in limited market rollouts with plans for nationwide distribution later this year.

In December 2012, DIRECTV provided power consumption data for these newest HR44 Genie server and C41 client products devices to EPA. Since then, these devices have also been listed on ENERGY STAR's Qualified Product List. As mentioned above, because HR44 is 30% more efficient and C41 is up to 15% more efficient than their predecessors, a typical three room whole-home HD DVR installation incorporating these products uses 25% less energy overall. Requiring only 83 kWh/yr per TV, HR44/C41 now even outperforms BSkyB's HD DVRs on a per-TV served basis.

I understand from my staff that there have been two drafts of the Version 4.1 Specification circulated so far this year. In both drafts, either our server or our client would not meet the requisite limits. The Advanced Video Processing and High Definition Resolution allowances provide for the energy demands of MPEG H.264 video decoding and HD output support. With these allowances, the EPA would still achieve significant energy consumption reductions comparable to those achieved when Version 3.0 was adopted. In our case, the Version 4.1 energy consumption limit for a Genie server plus two clients would be 289 kWh/yr, a 22% reduction from the Version 3 limit of 372 kWh/yr. This reduction is comparable to the 19% reduction from Version 2 (limit of 458 kWh/yr) to Version 3 for this same architecture. Most significantly, we would achieve a world-leading requirement of less than 100 kWh/yr on a per-TV served basis.

As these products will represent the lion's share of DIRECTV's product purchases throughout 2014 and 2015, any meaningful participation by DIRECTV in ENERGY STAR during these years hinges on these products qualifying. I am hopeful that the EPA's next draft will acknowledge these brand new, state-of-the-art and highly efficient products and allow them to carry the ENERGY STAR logo after the Version 4.1 effective date.

Best regards,

Rômulo Pontual
Executive Vice President and CTO

P.S. Please find my team's detailed comments for Draft 2 in the attached.

Cc:
Beth Craig, EPA
Matt Malinowski, ICF
Rachel Unger, ICF
Tom Bolioli, Terra Novum

Attachment: DIRECTV Detailed Comments

Steve Dulac/Kuriacose Joseph

July 10, 2013

Detailed comments on ENERGY STAR® Set-top Box Draft 2 Version 4.1 Specification follow:

Definition Changes:

Multi-room Definition Revision: DIRECTV supports the new Multi-room definition revision. However, the ability to share a DVR recording with a non-DVR device does result in energy savings, even while the savings is limited since the non-DVR device must connect to the service provider network for live TV. DIRECTV would support the creation of a new "Multi-room DVR" definition and allowance, which couldn't be taken in addition to the newly defined Multi-room definition, but which would provide some amount of benefit (e.g. 28 kWh/yr = half of the MR allowance) for DVRs with this feature. We also request clarification of the concept of providing "head-end interaction for Thin Client STBs" which has been included in the multi-room definition. It would seem that the provision of live streams already provides such head-end interaction.

New Ultra HD, High Efficiency Video Processing, Three-dimensional (3D) Capability Definitions: DIRECTV supports the inclusion of UHD and HEVP definitions in the new ENERGY STAR STB product specification. By declining to assign initial allowances to these definitions, however, EPA is choosing to make it impossible for the initial UHD capable products to receive the ENERGY STAR label. It would be preferable for EPA to start with the seemingly modest values in effect in Europe (for UHD and HEVC, at least) and revise the allowances as supported by product data as more and more products become available. There is no risk that a STB manufacturer will put expensive UHD or HEVC capability into a product (with all of the NRE and recurring costs that would result from integrating new silicon, additional video memory, etc.) solely to get an additional 50 kWh/yr of allowances to qualify for ENERGY STAR. Regarding the new 3D definition, it might be good to clarify that this refers to full-resolution 3D rather than frame-compatible 3D that is supported by Industry today.

Allowance Changes:

Removal of Advanced Video Processing (AVP) and High Definition (HD) Resolution: The EPA appropriately removed the Removable Media Player allowances because these features were not being incorporated into set-top boxes. However, this was certainly not the case for the HD and AVP allowances - in fact quite the opposite was true. Almost all new products being qualified had the HD and AVP features and were using these allowances. Understanding that these features contributed to the energy usage of a STB, EPA decided to accommodate this change in the base allowances. The EPA should have simply taken the HD and AVP allowances proposed in Draft 1 of 8 and 16 kWh/yr (which reduced by a third the V3 allowances of 12 and 25 kWh/yr) and added these to each of the base allowances. For example, the satellite base allowance would change from 50 kWh/yr to 74 kWh/yr using this method. DIRECTV believes that this is the best way to accommodate the elimination of the HD and AVP allowances, and urges EPA to go back and use this simple and intuitive approach. In contrast, DIRECTV believes that the method proposed by EPA in Draft 2 (i.e. re-assessing base allowances based on current QPL data) is critically flawed in many respects, as described further in the comments below.

Multi-room and DVR Revisions: To encourage multi-room DVR solutions, EPA chose to maintain the DVR and multi-stream allowances at current levels and to increase the (newly defined) Multi-room

allowance. We believe that these decisions will have the effect of increasing development and deployment of server-client architectures, which in turn will significantly improve whole home energy consumption.

Home Network Interface and MIMO Wi-Fi Revisions: The EPA proposes values in Draft 2 that better reflect the actual power consumptive impact of advanced home networking technologies increasingly found in set-top boxes today. Comments from stakeholders (including DIRECTV) in response to the Draft 1 proposal were acknowledged for the most part by these changes. A key exception is that the proposed HNI value of 10 kWh/yr still falls a few kWh/yr short of the actual impact of MoCA, according to comments made at the webinar by key MoCA technology vendor Entropic. We note that the formula for the MIMO wireless allowance assumes the availability of the HNI adder, an allowance that cannot be used explicitly in the context of multi room servers. This is a concern, especially when the server includes both wired and wireless interfaces to the clients. We recommend the addition of a server_wireless_HNI_base allowance, and based on the fact that these servers are designed to transmit service quality video on the wireless link, we recommend a value of 20 kWh/yr for this allowance.

Access Point, Router, and Telephony Additions: To encourage manufacturers of Displayless Video Gateways, new allowances for features commonly associated with small networking equipment have been proposed by EPA. DIRECTV welcomes these new adders and shares EPA's expectation that devices without direct video connections will become more common in the near future. Regarding the application of the router and access point allowances, based on what we believe was stated at the Stakeholder Webinar, DIRECTV is expecting a correction to what is indicated in lines 338 and 339 of the current draft. We assume that the Router and Access Point allowances are also applicable to devices that provide multi room services, where the HNI allowance cannot be taken.

Change in analytical methodology:

The EPA presented an analysis at the 17 June Stakeholder Webinar used to come up with proposed "25% compliance" Draft 2 base allowances, and followed up on 21 June with the spreadsheet "dataset" that was used. After reviewing the satellite-based information, DIRECTV has identified a few issues:

- The data must not include SD boxes, or boxes tested only in SD mode, if it is being used to determine a base allowance for boxes having HD and AVP capability. There are 5 DIRECTV SD boxes in this category from the ENERGY STAR Qualified Product List (QPL). These not surprisingly appear as the leftmost 5 dots in the Webinar "Satellite" chart (slide 32).
- Analysis should be based on real data, which is the functionality that was exercised during testing and which is the basis of qualification, and no assumptions can really be made about how the enhanced functionalities for the product might or might not impact power consumption outside of the actual test. There is the underlying premise in the EPA's analysis that there is perfect correlation between the adder specs and actual impact of adders on STBs, and there isn't any evidence regarding how good this correlation really is. The QPL itself unfortunately had errors in it which also altered the analysis in this regard. This includes two DIRECTV L14 boxes incorrectly identified as having HD, AVP and HNI additional functionality.
- There are not nearly enough data points to conclude what the "25% compliance" base allowance should be. For example, there are only about a dozen non-SD boxes from the QPL that can be used in the "Satellite" analysis. Additionally, without the 5 DIRECTV SD boxes, the 25% line should also be raised about 20-25 kWh/yr.
- This analysis, which is based on measured data, does not account for manufacturing variations. This is a very real and well-established phenomenon, and DIRECTV internally applies a ~5% margin before it can decide that a set-top box should carry the ENERGY STAR logo. The "Satellite" chart (slide 32) shows a base energy consumption proposal that is exactly aligned with DIRECTV's HR44 product's measured energy consumption of 167 kWh/yr. HR44, however, has no margin to account for

manufacturing variations and cannot be qualified.

- It is inconsistent to apply this analysis method for Cable, Satellite and IP base energy consumption and then NOT use this analysis method for thin clients. As the EPA's datasheet shows, if a thin client chart had been created from the QPL data using this same (problematic) methodology, base values of 30, 34, 37, 58 and 67 would have resulted…values that are much higher than the EPA proposed thin client base allowance of 15.

DIRECTV recommends that EPA abandon this method for determining base allowances, which has resulted in unattainable targets across all categories. One quick fix is to modify the base allowances by simply folding the Draft 1 HD and AVP allowances into them.

Deep Sleep State Changes:

The utilization of deep sleep modes is an admirable goal, and EPA is commended for its efforts in nurturing adoption of deep sleep. Service providers with one-way broadcast networks are at a significant disadvantage to their two-way competitors when it comes to maintaining an excellent customer experience with deep sleep modes. DIRECTV encourages the EPA to not be prescriptive in the conditions imposed on deep sleep modes (e.g. by defining a maximum time to awaken from deep sleep), and to not be limiting in the devices that may find ways to implement deep sleep (e.g. by precluding thin clients from earning a deep sleep incentive). In addition, DIRECTV continues to maintain that implementation of a deep sleep mode should never be a condition for earning the ENERGY STAR logo, but that this be based solely on an annual energy consumption metric.

Concluding remarks:

DIRECTV urges the EPA to take the time to get it right and produce a specification that is effective and ensures that the Energy Star program for STBs continues to make its remarkable impact in the cause of increasing energy efficiency in this Industry. We would note that if the changes between a new version of the specification and Draft 2 are anything like the changes between Draft 1 and Draft 2, it could take considerable effort to vet the new document and produce a Final Draft by consensus of the stakeholders (which as per EPA's own guidance requires nothing more than editorial changes and text clarifications to become a Final Spec).

We look forward to continued participation in this Version 4.1 review process.