



**Jeffrey H. Dygert**  
Executive Director, Public Policy  
AT&T Services, Inc.  
1120 20<sup>th</sup> Street NW  
Washington, DC 20036

T: 202-457-3844  
[Jeffrey.Dygert@att.com](mailto:Jeffrey.Dygert@att.com)

December 18, 2015

**Via email only:** [stbs@energystar.gov](mailto:stbs@energystar.gov)

Ms. Katharine Kaplan  
Manager, Energy Star Product Development and Program Administration  
Office of Air and Radiation  
United States Environmental Protection Agency  
Washington, D.C. 20460

**Re: November 16, 2015 Draft 1 ENERGY STAR Version 5 specification for set-top boxes (STBs)**

Dear Ms. Kaplan:

AT&T Services, Inc., on behalf of itself and its affiliates (“AT&T”), respectfully submits these comments in response to the U.S. Environmental Protection Agency’s (“EPA”) November 16, 2015, request for comments on its Draft 1 ENERGY STAR Version 5 (“Draft 1”) Specification for set top boxes (“STBs”).

**A. Introduction.**

Thank you for this opportunity for AT&T<sup>1</sup> to comment on the Draft 1 specification. Given AT&T’s and DIRECTV’s shared and extensive history of participating in the ENERGY STAR program for STBs, the company is particularly interested in participating in the development process for Version 5. The qualified products list on the ENERGY STAR website represents 45 unique set-top box models. Of these, AT&T is responsible for 27 models<sup>2</sup> or 60% of the total Version 4.1 qualified products. In both the Satellite and Thin Client base types, 100% of the qualified products are AT&T’s.

AT&T is concerned that the Draft 1 proposal reflects overly aggressive efficiency improvements for Service Providers and Manufacturers, particularly since the proposed compliance date is only a year away. For the models that AT&T expects to be purchasing after January 2017, the Draft 1 proposal represents more than a one-half decrease in energy use for Thin Client models, compared to Version 4.1, and more than a one-third decrease in energy use

---

<sup>1</sup> AT&T’s purchase of DIRECTV closed in July 2015. AT&T currently provides Satellite TV service branded DIRECTV and IPTV service branded U-Verse.

<sup>2</sup> The 27 AT&T models include 22 DIRECTV models (9 Thin Clients and 13 Satellite STBs), Cisco models ISB7105 and ISB7500, Arris models VIP2502 and VIP2250, and Pace model VIP2500.

for non-Thin Clients. Under the proposed specifications, AT&T would be unable to qualify even one Thin Client model, nor will we be able to qualify any Satellite models operating in a single-room mode.

There are three key concerns that AT&T would offer for consideration as EPA prepares Draft 2: 1) the challenges in delivering low power sleep modes in Thin Clients, 2) the lack of an adder for Multi-stream for STBs and Thin Clients having PIP capability, and 3) the need for Partners who are also Signatories to the STB Voluntary Agreement<sup>3</sup> to ensure they have significant margin in measured performance when comparing their results to the ENERGY STAR limits. These three very important issues are described in more detail in the sections that follow.

Please note that we have also appended an Attachment to this letter which includes supplementary comments on the larger set of proposals and questions raised by EPA in Draft 1, during the December 9 webinar hosted by EPA and in the analysis spreadsheets EPA has posted.<sup>4</sup>

## **B. Low Power Sleep for Thin Clients.**

During the webinar (slide 22), EPA described how a Thin Client with Deep Sleep enabled for 4 hours at 0.5W would justify a base allowance decrease of 77% (i.e. from 30 kWh/year in V4.1 to 7 kWh/year in Draft 1). Participants during the webinar questioned this assertion, and the Revised Dataset includes what EPA describes as “examples of the energy profiles of set-top boxes meeting Draft 1.” However, these examples only underscore stakeholders’ concerns.

The two Thin Client examples that the EPA provided are the DIRECTV C41-100 and DIRECTV C41-500 (“Wireless GenieMinis”). The hardware design of these devices precludes a deep sleep mode, as there is no ability to power down everything but the remote control interface. It is similarly not possible to meaningfully reduce the sleep power below what has already been achieved, as these devices do not have the costly additional hardware support needed for “Wake on WiFi” functionality. As the measured TEC for these wireless thin clients is 53 and 54, respectively, they both fail to meet Draft 1 – which, by our calculation, is 44 rather than 49 kWh/year (Base = 7, HNI = 17 and 5GHz MIMO(x4) = 20). Even with the efficiency

---

<sup>3</sup> The Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-top Boxes (“STB VA”), as amended January 1, 2014, included both AT&T and DIRECTV as Signatories.

<sup>4</sup> Drawing from both ENERGY STAR and STB Voluntary Agreement energy efficiency reporting data, these spreadsheets (“Draft 1 V5.0 STB Analysis Dataset.xlsx”, and “Revised Draft 1 V5.0 STB Analysis Dataset.xlsx”) are complex and a revision with major corrections was released only two days before the deadline for filing these comments. AT&T respectfully requests EPA’s flexibility in accepting additional comments if we discover additional corrections or specific observations regarding these spreadsheets in the near future.

improvements that EPA hypothesizes for these two models – a TEC of 45 kWh/year for a 0.5W deep sleep mode and 46 kWh/year for a “20% reduction to sleep” mode – they fail to meet the 44 kWh/year target that Draft 1 would establish.

EPA’s Revised Dataset does not present an example for wired (MoCA) Thin Clients; in these cases the failure to meet Draft 1 is even more pronounced. The Draft 1 TEC requirement for these is only 24 kWh/year (Base = 7 and HNI = 17), while the devices in the Dataset have measured TECs in the 36-40 kWh/year range. Even after MoCA 2 capability becomes readily available in candidate silicon, expected to begin next year, the energy savings from a reduced sleep power in these future models will be upwards of 10 kWh/year. This is still not sufficient to meet the stringent requirements in Draft 1.

For the Thin Client models included in the Revised Dataset, none of the 13 models are capable of meeting the Draft 1 proposal.

### **C. Multi-stream allowance and Picture-in-Picture.**

There is no disagreement that the Picture-in-Picture (PIP) feature merits having an allowance associated with it, as PIP requires an STB or Thin Client to process two simultaneous video streams, each requiring independent video decryption and decompression functions. In fact, in Draft 1 EPA has clarified (webinar slide 25) that the Multi-stream definition should include PIP. However, at the same time EPA proposes reducing the multi-stream allowance from 16 to 0 for Cable/Satellite type boxes and from 6 to 0 for IP boxes, asserting that such “Functionality [is] covered by DVR, HNI, MR in most circumstances.” EPA’s explanation in Draft 1 that “the advent of full-band tuners should permit tuning multiple channels without the energy overhead” does not apply to Thin Clients and does not address the need for dual video decryption and decompression functions.

It is precisely for PIP that a multi-stream allowance continues to be necessary. AT&T provides basic HD satellite boxes and thin client boxes having PIP: these do not have multi-room or DVR, however, and the HNI allowance of 17 kWh/year is simply insufficient to cover the multi-stream capability as well. AT&T has several Version 4.1 qualified Satellite base products that would not have qualified but for the PIP feature allowing the multi-stream adder to be applied as well. Zeroing out the Multi-stream allowances effectively penalizes companies for designing STBs (including Thin Clients) having PIP capability.

### **D. Comparisons with STB VA Tier 2 are misleading due to different verification test regimes.**

Verification testing in the STB VA Tier 2 includes margin for test variability, agreed upon by all STB VA signatories. As set out in the VA’s 2014 Annual Report, this margin is the lower of 10% or 20 kWh/year for set-top boxes with an on-power mode of at least 10W, and 10 kWh/year for lower-power devices.

Ms. Katherine Kaplan

December 18, 2015

Page 4

In ENERGY STAR, on the other hand, there is zero margin allowed in verification testing. If a qualified product exceeds the ENERGY STAR limit by any amount whatsoever during verification testing, a process unfolds that may include negative publicity for the Partner and penalties from EPA. As a result, Partners must make a risk/reward decision when choosing to qualify products: if the measured result is too close to the limit, variability in manufacturing and small performance differences (e.g. from different software configurations or test lab environments) can put a product over the limit.

Historically, DIRECTV has required 5% margin for its higher-power satellite boxes, and at least 10% for lower-power boxes, before it would proceed with ENERGY STAR certification. When this margin is factored in, the ENERGY STAR requirements effectively become more stringent than the STB VA requirements, e.g. for a hypothetical device that has the same TEC target in each program. For AT&T, where higher-power boxes are quickly becoming a thing of the past, this currently translates into a 10% tougher standard for ENERGY STAR compliance. When drawing comparisons with the STB VA Tier 2, we respectfully request that EPA also keep this very real issue in mind.

#### **G. Conclusion.**

AT&T shares EPA's goal of ensuring the ENERGY STAR label represents the "best of the best", as described during the Webinar. By addressing these key concerns and the concerns raised by other stakeholders, EPA will help Partners meet this goal while simultaneously maintaining, and perhaps even increasing, STB program participation.

Sincerely,

/s/  
Jeffrey H. Dygert

Attachment:  
Additional AT&T Comments

**MIMO HNI allowance (Webinar slide 17):** EPA writes that the proposed reduction in the MIMO HNI allowances is “based on Results of Small Networking Equipment testing and analysis.” While the supporting test data and analysis was not shared with stakeholders for comment, a few suggestions can still be made:

- EPA should consider separating the MIMO HNI allowance into a MIMO HNI Server allowance and a MIMO HNI Client allowance, for two reasons:

1) More energy is expended on the transmitter (i.e. server) side than on the receiver (i.e. client) side. For example, an experiment using a DIRECTV Wireless Video Bridge transmitter connected wirelessly to a C41W thin client showed the power usage of the transmitter increasing by 0.7W and the receiver increasing by only 0.2W as the path loss was increased between them. This suggests that more server power than client power is used to complete the link.

2) It is more likely that deep sleep modes will become possible in the future on the client side than on the server side. This may allow the MIMO HNI Client allowances to be revised down over time with this reduced duty cycle in mind.

- EPA’s proposal to reduce this allowance from 3 kWh/year (2.4 GHz) and 10 kWh/year (5 GHz) per stream to 2 kWh/year and 5 kWh/year, respectively, should be revisited in light of the possibility of separating these allowances. For example, the MIMO HNI Server allowance might remain higher e.g. at 3 (2.4 GHz) / 10 (5 GHz) and the MIMO HNI Client allowance might be made lower e.g. at 2 (2.4 GHz) / 5 (5 GHz).

- In the SNE VA, idle power is used. EPA should be careful to not rely on idle power measurements, as the ENERGY STAR V4.1 STB test procedure requires the HNI MIMO functionality to be active.

**“Example STB TEC” tab in the Revised Dataset:** EPA writes that this new tab “includes examples of the energy profiles of set-top boxes meeting Draft 1,” but it includes only two examples that are relevant and pass Draft 1 (the “MVPD IP Basic STB” and the “MVPD IP MR DVR”). The other five examples fail to meet Draft1 or are not relevant examples:

- “Thin Client 1” (DIRECTV C41-100) and “Thin Client 2” (DIRECTV C41-500): the Draft 1 TEC requirement for these is 44 kWh/year, not 49 as shown in the spreadsheet. The measured TEC for these devices is 53 and 54, which significantly exceed 44 kWh/yr. Deep sleep and lower power modes are not possible, even with a software upgrade, due to limitations in these devices’ hardware designs.

- “Cable Basic STB” (LG STB-2000): the STB is designed for hospitality (e.g. hotel) applications and relies on a hotel’s commercial hotel head-end server system to operate. This STB is not designed for residential video consumption.

- “Satellite Basic STB” (DIRECTV L14): this is a standard definition, MPEG2 only STB and therefore not a relevant example. The best example in the dataset, DIRECTV H25-100, is a true satellite HD basic STB having a measured TEC of 78 which comes nowhere close to passing the Draft 1 target TEC of 57.

**Analysis Dataset and Revised Dataset:** A number of needed corrections have been identified by AT&T in the course of reviewing the analysis spreadsheets posted by EPA. AT&T expects

that the list that follows is not comprehensive, and expects other stakeholders will have corrections to suggest as well. We respectfully suggest that EPA not perform regression studies or draw any conclusions from the dataset before all proposed corrections are made and confirmed by stakeholders:

- One listing on the ENERGY STAR V4.1 QPL, H44-500 Single Room non-DVR operating mode, is missing from this analysis.
- The “VA Adder Allowances” (Column BJ) and “Meets VA?” (Column BK) are not generally correct. It appears that not all of the adders applicable to many STBs for the VA case are included. For example: all 22 ENERGY STAR Version 4.1 compliant DIRECTV STBs and Thin Clients also meet Tier 2 currently, however the spreadsheet incorrectly shows 12 of these not meeting Tier 2. This incorrectly suggests the Tier 2 limits are tougher than they really are.
- Listings for ten out-of-production DIRECTV models (D12, H24, H25-700, HR24, HR34 and C31) are included in the analysis, probably drawn from the 2013 STB VA Annual Report data.
- There may be duplicate entries in this analysis from models that appear both on Energy Star and VA lists, and in the case of some Energy Star models they appear multiple times as they were qualified in several operating modes (e.g. single room / multiroom, non-DVR / DVR). Before counting the percentage of models that meet a proposed set of allowances, or applying any regression analyses, this redundancy should be considered.

**- DVG and STB definition (Draft 1 Question from EPA):** AT&T supports EPA combining the DVG and STB definitions into a single STB product category. DVG devices can remain squarely within the STB product category, if the STB definition is written to include operation with “Thin-Client / Remote” product types as well:

*Set-top Box (STB): A device combining hardware components with software programming designed for the primary purpose of receiving television and related services from terrestrial, cable, satellite, broadband, or local networks and providing video output using at least one direct video connection or using **Thin-Client Remote product types**.*

**- Client Only Incentive (Draft 1 Question from EPA):** EPA asks if this incentive is necessary, having received feedback that Multi-room STBs already decrease energy consumption when transmitting content to clients rather than the display. AT&T encourages EPA to leave this incentive in place for Version 5, as it encourages implementations that reduce energy consumption in this common use case (e.g. watching TV in a bedroom while not watching TV in the living room).