



ENERGY STAR for Set-top Boxes

Draft 2 Program Requirements for
Cable, Satellite, and Telecom Service Providers
and
Set-top Box Manufacturers

Stakeholder Meeting

October 16, 2007

San Diego, CA





Welcome and Introductions

Katharine Kaplan, U.S. EPA

Today's Agenda



- 2:10 p.m. Overview of Draft 2 Specifications
 - Review of Service Provider and Manufacturer Specifications
 - Summary of Key Changes Reflected in Draft 2 Specs
 - Manufacturer Specification Recap
 - Service Provider Specification Recap
- 3:00 p.m. Q&A Session Regarding Draft Specifications
- 3:30 p.m. Break
- 3:40 p.m. Stakeholder Presentations on Draft 2 Specifications
- 4:20 p.m. Discussion of Stakeholder Presentations & Draft 2 Specifications
- 5:35 p.m. Update of TC 100 Proposal to Incorporate STBs into IEC 62087
- 5:45 p.m. Timeline and Summary of Action Items
- 6:00 p.m. Adjourn



Review of Service Provider and Manufacturer Specifications Summary of Key Changes Reflected in Draft 2

Katharine Kaplan, U.S. EPA
Darcy Martinez, ICF International

Goals for an STB Program



- Develop a STB program that drives for the **greatest energy savings** practical for this category.
- Identify appropriate **roles and responsibilities** for all relevant stakeholders.
- Develop energy efficiency specifications for STBs that are **performance-based** – recognizing leaders in the market in terms of energy efficiency.
- Make use of existing test procedures and **harmonize**, where technically appropriate, with domestic and international partners on both test procedures and requirements.
- Develop Program Requirements that offer **longevity** as well as **fair comparison** of products, and consideration of feature richness.

Proposed Structure and Roles



- EPA has proposed roles and associated Program Requirements for both Cable, Satellite, and Telecom Service Providers and Manufacturers of Set-top Boxes.
- **Proposed Roles for Service Providers:**
 - Purchase and deploy qualified STBs.
 - Ensure STBs maintain qualification.
 - Maintain labeling arranged by Manufacturer.
 - Deploy user interface to inform subscribers of efficiency opportunities.
 - Educate subscribers about energy-saving features and partner's commitment to efficiency.
 - Train sales staff/customer service representatives.
 - Share deployment data with EPA.

Proposed Structure and Roles (Cont.)



- **Proposed Roles for Manufacturers:**
 - Meet energy efficiency and power management requirements and qualify products with ENERGY STAR.
 - Label qualified products sold at retail or provided to Service Providers participating as ENERGY STAR partners as well as collateral material (and explain conditions under which model meets ENERGY STAR).
 - Share unit shipment data with EPA.

Key Changes in Draft 2



- **Timing**

- Draft 1 proposed a single tier, effective in 2009, for both Service Providers and Manufacturers.
- Draft 2 recognizes near term and longer term possibilities for improved efficiency with two tiers for Manufacturers effective in September 2008 and January 2010.
- Draft 2 proposes three annual purchase and deployment percentage requirements for Service Providers effective in January 2009, April 2010, and April 2011. EPA anticipates that these annual percentage requirements will reflect the level of challenge associated with the STB requirements in effect.

Key Changes in Draft 2 (Cont.)



- **Labeling**

- Inclusion of an electronic labeling option.
- Clarification regarding Manufacturer responsibility to label only products sold at retail or to Service Providers participating as ENERGY STAR partners and to describe in printed or electronic information conditions under which product meets ENERGY STAR requirements.
- Clarification regarding Service Provider responsibility to maintain Manufacturer labeling.

Key Changes in Draft 2 (Cont.)



- **Energy-efficiency Criteria**

- Inclusion of proposed Tier 1 and 2 levels for base functionality annual energy allowances for all products except IP STBs.
- Inclusion of proposed Tier 1 and Tier 2 levels for additional functionality annual energy allowances.
- Articulation of duty cycle assumptions.
- Inclusion of external power supply requirement for products using an EPS.



Manufacturer Specification Recap

Thomas Bolioli, Terra Novum
Dave Beavers, The Cadmus Group

Topics



- Review of structure and approach
- Key definitions
- Criteria
- Rationale for criteria levels
- Test procedure
- Stakeholder comments and responses

Review of Structure and Approach



- EPA Goals for STB specification include:
 - Develop energy efficiency specifications for STBs that are performance based.
 - Develop Program Requirements that offer longevity and fair comparisons.
 - Employ tiered requirements to recognize what is/may be achievable in time.
- Total Energy Consumption (TEC) Approach
 - Criteria specified in kWh/year rather than Watts.

Review of Structure and Approach (Cont.)



- Goal of STB specification is to **save energy**.
 - Savings target-criteria better matches desired outcome.
- Provides manufacturers flexibility.
- Allows for additional functionality allowances such as integrated DVRs, extra tuners.
- Less likely to result in perverse outcomes:
 - Guards against products that meet the criteria, yet actually use more energy than those that don't meet the criteria.

Key Definitions



- Power states from the user's point of view:
 - “Standby” simply means when the user pushes the standby button. For purposes of this specification, a Standby state initiated by a user (Standby-Manual) is distinguished from a Standby state that is initiated by an Auto Power Down event (Standby-Auto Power Down).
 - “On/Active” can include periods when a STB is recording or playing back recorded material.
 - “Off” is a state in which there is negligible or no power consumption.

Criteria



- Criteria levels for both Base Functionality (tuner) and Additional Functionalities:
- Base Functionality category determined following Section 3B.
- Tier 1 and Tier 2 levels proposed (rationale for proposed levels to be discussed in next section).

Criteria (Cont.)



- Base Functionality (i.e., tuner) Allowance:

Base Functionality Annual Energy Allowance		
Base Functionality	Tier 1 Annual Energy Allowance (kWh/year)	Tier 2 Annual Energy Allowance (kWh/year)
Cable	70	42
Satellite	88	44
IP	TBD	TBD
Terrestrial	27	22

- Examples:
 - A standard definition Cable STB with no Additional Functionalities under Tier 1: 70 kWh/yr [DONE].
 - A high definition Satellite STB with DVR under Tier 2: Base Allowance is 44 kWh/yr [NEED TO CONSIDER ADDITIONAL ALLOWANCES].

Criteria (Cont.)



- For STBs with one or more of the Additional Functionalities, add the values for each applicable functionality to the Base Functionality Allowance.

Additional Functionalities Annual Energy Allowance		
Additional Functionalities	Tier 1 Annual Energy Allowance (kWh/year)	Tier 2 Annual Energy Allowance (kWh/year)
Additional Tuners	53	8
Additional Tuners – OTA	14	8
Adv. Video Processing	18	7
DVR	83	32
High Definition*	35	12
Removable Media Player	12	6
Removable Media Player/Recorder	23	6

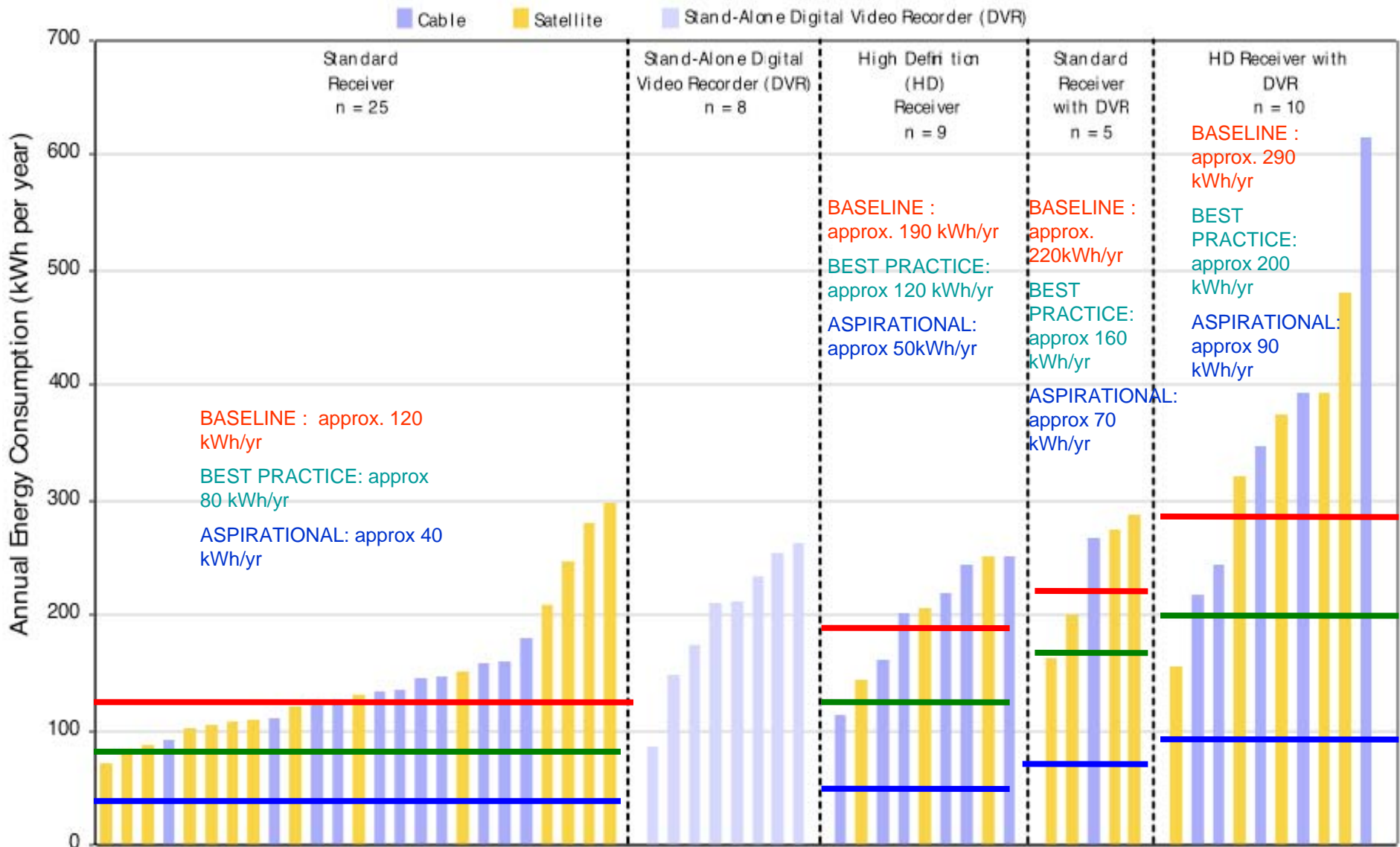
- Example: A high definition Satellite STB with DVR under Tier 2: 44 + 12 + 32 = 88 kWh/yr.

Rationale for Criteria Levels



- **Current Best Practices (Tier 1):**
 - Criteria set based on most efficient units currently available.
 - Data available: Pace and Motorola IEA presentations & CEA/TIAX & NRDC Reports.
 - Savings from powering down DVRs.
- **Next Generation Technology (Tier 2):**
 - Savings from powering down cable and satellite tuners.
 - Savings from reduced on mode power use

Annual Energy Consumption of Today's Set Top Boxes



V2 Proposed ENERGY STAR STB Criteria vs. NRDC data set. 10/10/07

Test Procedure



- Based on CSA 380-06.
- Modified to be used with TEC-based criteria.
- List of Tests:
 - 5.3 Active Tests:
 - 5.3.1 Live TV (P_{TV})
 - 5.3.2 Recording Live TV (P_{Record}) [e.g., DVR]
 - 5.3.3 Playing Back Recorded TV ($P_{Playback}$) [e.g., DVR]
 - 5.3.4 Multiple Tuner Test
 - 5.3.5 Removable Media Playback Test ($P_{Playback}$) [e.g., DVD]
 - 5.3.6 Removable Media Record Test (P_{Record}) [e.g., DVD]
 - 5.4 Inactive Tests:
 - 5.4.1 Standby Test ($P_{Standby}$)
 - 5.4.2 Auto Power Down (P_{AutoPD})

Test Procedure (Cont.)



To compare to the allowance, apply the average power values obtained from the TP to one of the following:

A product with no APD

$$kWh_{\text{Base}} = 0.365 \times (14 \times P_{TV} + 10 \times P_{S \tan dby})$$

A product that does implement APD

$$kWh_{\text{Base}} = 0.365 \times ((7 \times P_{TV}) + (10 \times P_{S \tan dby}) + (7 \times P_{\text{Auto PD}}))$$

If the STB includes a DVR or DVD player/recorder, one additional step is needed.

Test Procedure (Cont.)



- For On-Playback and On-Record, use the following equation to calculate energy usage employing the corresponding duty cycles from the table:

$$kWh_{\text{Play/Record}} = 0.365 \times \sum_1^2 (P_{\text{mode}} - P_{TV}) \times H_{\text{mode}}$$

Duty Cycle				
Mode	DVR (Hours/Day)	Removable Media Playback (Hours/Day)	Removable Media Playback w/ Record capability (Hours/Day)	Additional Tuner Usage
Hours On-Playback (H_{Playback})	2	2	2	1
Hours On-Record (H_{Record})	3	0	1	2

Test Procedure (Cont.)



- Lastly, calculate the total device usage by adding the results for Playback and Record (if applicable) to the kWh_{Base} .

$$kWh_{Total} = \sum_{1}^{n} kWh_{Funcs}$$

- If the calculated usage value is less than the calculated allowance value, a STB can qualify for ENERGY STAR.

Example



- HD DVR cable STB, Tier 1
- No auto power down capability

$$P_{TV} = 24.0 \text{ Watts and } P_{Standby} = 18.0 \text{ Watts}$$

$$\text{kWh}_{\text{Base}} = 0.365 * (14 * 24.0 + 10 * 18.0) = 188.3 \text{ kWh/yr}$$

$$W_{\text{Playback}} = 30.0 \text{ Watts and } W_{\text{Record}} = 32.0 \text{ Watts}$$

$$\text{kWh}_{\text{Play/Record}} = 0.365 * (2 * (30.0 - 24.0) + 3 * (32.0 - 24.0)) = 13.1 \text{ kWh/yr}$$

$$\text{Total kWh} = 13.1 + 188.3 = \mathbf{201.4 \text{ kWh/yr}}$$

Example



- HD DVR cable STB, Tier 1
- With auto power down capability

$P_{TV} = 24.0$ Watts and $P_{Standby} = 18.0$ Watts

$$\text{kWhBase} = 0.365 * (7 * 24.0 + 10 * 18.0 + 7 * 18.0) = 173.0 \text{ kWh/yr}$$

$W_{Playback} = 30.0$ Watts and $W_{record} = 32.0$ Watts

$$\text{kWhPlay/Record} = 0.365 * (2 * (30.0 - 24.0) + 3 * (32.0 - 24.0)) = 13.1 \text{ kWh/yr}$$

$$\text{Total kWh} = 173.0 + 13.1 = \mathbf{186.1 \text{ kWh/yr}}$$

Stakeholder Comments and Responses



Topic	Additional Functionalities
Comment	Include analogue video processing, advanced video processing (MPEG-4), and DOCSIS cable modems as Additional Functionalities.
Response	EPA has taken the approach of categorizing STBs using their functions and not considering specific technologies, at least where categorization is concerned. EPA does agree that Advanced Video Processing may warrant consideration and seeks feedback on this.

Stakeholder Comments and Responses (Cont.)



Topic	Multi-box Systems
Comment	While we do support this approach (using a multiplier) we encourage EPA to consider possible unintended consequences. Would a STB that has the capability to power multiple televisions be eligible for the higher energy allowance regardless of whether or not it is actually used to power more than one television? How will EPA ensure that energy savings result in these situations?
Response	Using a multiplier to draw down on the allowance of multi-TV based STBs has been removed from the Draft 2 specification, but will be revisited if the data suggests it is feasible to do so. Currently, multi TV systems with three STBs, for example, will need to meet the same requirements as three comparable individual TV STBs. However, EPA is investigating what, if any, unintended consequences may exist with this approach and may change it in the future.

Stakeholder Comments and Responses (Cont.)



Topic	TEC Approach
Comment	Commenter sees little benefit from the duty cycle approach proposed by EPA. A set top box energy use is dependent upon: a) box design, b) user behavior, and c) equipment and decisions made by the service provider, we think one can not rely on a duty cycle approach to yield “reliable” energy savings.
Response	EPA is concerned with the current designs of boxes, but is also attempting to encourage the uptake of energy saving design changes such as those employed in other CE and IT products, which we feel are necessary to gain significant energy savings. We believe that the proposed approach seeks maximum savings while giving manufacturers the flexibility to achieve these savings where that best suits their customers needs.



Service Provider Specification Recap

Katharine Kaplan, U.S. EPA
Darcy Martinez, ICF International

Proposed Service Provider Requirements



- Purchase and deploy qualified STBs.
- Ensure STBs maintain qualification.
- Maintain labeling arranged by Manufacturer.

Proposed Service Provider Requirements (Cont.)



- Deploy user interface to inform subscribers of efficiency opportunities.
- Educate subscribers about energy-saving features and partner's commitment to efficiency.
- Train sales staff/customer service representatives.
- Share deployment data with EPA.



Q & A Regarding Draft Specifications



10 Minute Break



Stakeholder Presentation # 1

Noah Horowitz, Natural Resources Defense Council



Discussion of Stakeholder Presentations and Draft 2 Specifications

Katharine Kaplan, U.S. EPA



Update on TC 100 Proposal

Bill Belt, Consumer Electronics Association

Key Milestones



Key Milestone	Date
Publicly launch spec. development process by distributing announcement letter	March 15
Meetings in Denver with cable and satellite providers	April 25 - 27
Distribute an update document with a list of key questions for stakeholders	Early May
Stakeholder meeting in Washington, DC	May 15
Deadline for stakeholders to offer response to questions distributed in early May and share thoughts post May 15 stakeholder meeting	May 23
Release proposed specification approach and test procedure (First Draft)	June 29
Deadline for initial stakeholder comments on First Draft	July 12
International STB meeting at the IEA in Paris	July 4 - 6
Stakeholder meeting in Washington, DC	July 18

Key Milestones (Cont.)



Key Milestone	Date
Deadline for final stakeholder comments on First Draft and Paris meeting	July 27
Release Second Draft Specification with proposed levels	Oct. 5
Stakeholder meeting in San Diego, CA	Oct. 16
Deadline for stakeholder comments on Second Draft Specification	Nov. 14
Release Draft Final Specification	Late Nov.
Deadline for stakeholder comments on Final Draft Specification (expected to be minor)	Mid Dec.
Publication of Final Specification	Early Jan. 2008
Specification effective date	Sept. 2008

Action Items



- EPA corrects examples in presentation; posts presentation to www.energystar.gov.
- EPA clarifies intentions for treating advanced video processing vs. decoding in specification.
- EPA clarifies requirements/options for labeling a model shipped to both partners and non-partners. Stakeholder feedback is encouraged.
- EPA clarifies Service Provider purchase and deployment requirements: % of new boxes purchased, \$ of ALL boxes deployed, other?
- EPA revisits “sleep” vs. “standby.”
- EPA provides detail on how criteria in specification were developed.

Action Items (Cont.)



- EPA proposes dates next week for a conference call to discuss remaining topics.
- EPA notifies all stakeholders that the Draft 2 comment deadline is extended November 14.
- Stakeholders contact Darcy Martinez, ICF at dmartinez@icfi.com to request password-protected access to CSA 380-06 with EPA suggested edits.

Contacts



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