

**VOLUNTARY AGREEMENT
FOR ONGOING IMPROVEMENT TO THE ENERGY EFFICIENCY OF SET-TOP BOXES**

As Amended Effective January 1, 2025

This document sets out a Voluntary Agreement between the undersigned Signatories to continue improvements in the energy efficiency of Set-Top Boxes used in the distribution of digital video signals.

1. Purpose

- 1.1. The purpose of this Voluntary Agreement is to continue improvements in the energy efficiency of Set-Top Boxes used in the delivery of services by Service Providers, thereby further reducing potential environmental impact and increasing benefits to consumers. Fostering device and service functionality while encouraging innovation and competition by Service Providers and Manufacturers are equally important objectives of this Voluntary Agreement.
- 1.2. Energy efficiency improvements will be pursued provided that such improvements do not jeopardize the intended uses and functionalities of Set-Top Boxes; that they preserve or enhance the customer experience; and that they are sufficiently flexible to adapt to technological options and market competition, to improve functionality, to offer service enhancements, and to foster rapid innovation.
- 1.3. This Voluntary Agreement is intended to be a complete and adequate substitute for all Federal and State legislative and regulatory solutions for the energy efficiency of Set-Top Boxes. The Signatories agree that this agreement is the preferred means for addressing the energy consumption of complex, networked, digital video service set-top boxes that are generally owned by the Service Provider and integrated with distribution networks, but deployed within the premises of customers.
- 1.4. The Signatories agree that energy efficiency measures should not create undue burdens or competitive disadvantages for Service Providers compared with other means of distributing video programming and other programming services.
- 1.5. Nothing in this Voluntary Agreement shall preclude any party from implementing energy efficiency measures that exceed the commitments of this Agreement or from withdrawing from this Agreement at any time.
- 1.6. Each individual signatory has made the decision to participate in this Agreement based on its own independent interests and such decision is not conditioned on any understanding, tacit or express, on the participation of any other signatory.

2. Equipment Covered

- 2.1. This Voluntary Agreement covers only new Set-Top Boxes, as defined in Annex 1, ordered and placed into service in the United States by a Service Provider after the Effective Date. There is no retroactive effect on equipment that is deployed or in inventory prior to the Effective Date, nor is there any requirement to retire or change existing equipment or to change existing equipment that is returned to the Service Provider and refurbished, repaired, and/or upgraded, and then redeployed
- 2.2. The Signatories will consider modifications to the definition of Set-Top Box in Annex 1 in the event that a new type of Service Provider-supplied equipment that uses a customer's electricity to deliver residential multichannel video services represents a materially significant amount of energy use.

3. Service Provider Signatory Commitments for Set-Top Boxes

- 3.1. Service Providers, through their purchasing, will support and encourage the development of new Set-Top Boxes designed to minimize energy consumption as specified below while achieving the operational specifications, preserving their intended uses and functionalities, permitting ongoing innovation, preserving and enhancing the customer experience, and complying with existing applicable regulation.
- 3.2. Ninety percent (90%) of all new Set-Top Boxes that a Service Provider Purchases annually shall meet the Tier 4 efficiency levels.

4. Signatories to the Voluntary Agreement

- 4.1. Service Providers may become Signatories by signing Annex 7, Part A, with the effective date of such party's commitments established in such document.
- 4.2. Equipment Manufacturers and other vendors may become Vendor Signatories to the Voluntary Agreement by signing Annex 7, Part B. Each such Vendor Signatory endorses the purposes of the Voluntary Agreement.
- 4.3. The Energy Advocates are the Natural Resources Defense Council and the American Council for an Energy-Efficient Economy,¹ which became Signatories to the Voluntary Agreement as indicated in Annex 7, Part C. Additional Energy Advocates may become signatories upon the approval of the Steering Committee.
- 4.4. Each Signatory commits only to the areas which are under its individual control and responsibility.

5. Vendor Signatory Commitments for Set-Top Boxes

- 5.1. Vendor Signatories will use reasonable efforts to design and manufacture equipment, software and services to enable improved Set-Top Box energy efficiency while meeting the Service Providers' functional and operational specifications.

6. Testing

- 6.1. Set-Top Boxes shall be tested in the currently installed configuration using the test method as defined in ANSI/CTA-2043-B, Set-top Box (STB) Power Measurement, published by the Consumer Technology Association, or such successor standard as is approved by the Steering Committee ("Test Method.") and procedures referenced in Annex 2 (Program Requirements) and Annex 6 (New Features Process).
- 6.2. Service Providers may conduct their own testing for their annual statements as described in Section 7. All tests used for such statements and for lab verification pursuant to Section 8 must be conducted using the Test Method.
- 6.3. The Signatories agree that consumers and stakeholders are best served by the consistent use of the same test method to measure the energy use of Set-Top Boxes, and will use best efforts to discourage any Federal or State authority from initiating any proceeding to consider the adoption of any mandatory test method for Set-Top Boxes.

¹ The Appliance Standards Awareness Project (ASAP) is housed within the American Council for an Energy-Efficient Economy (ACEEE). Under ACEEE's auspices, ASAP was a signatory to Amendment 1 of the Voluntary Agreement. ASAP focuses on regulatory standards and was not involved in the development of Amendment 2 of the Voluntary Agreement, but supports its objectives and the role of ACEEE and the Natural Resources Defense Council (both ASAP Steering Committee members) in the Voluntary Agreement. ASAP is not required to separately perform proactive Energy Advocate obligations that are performed by ACEEE, but it will not engage in actions with respect to Set-Top Boxes that are inconsistent with the Energy Advocates' commitments established by the Agreement.

7. Reporting

- 7.1. Each Service Provider shall prepare a confidential annual statement by April 1 of each year containing the data for the prior Reporting Period during which it was a Signatory and submit the statement to the Independent Administrator as set forth below.
 - 7.1.1. The information in the Service Providers' annual statements shall include:
 - 7.1.1.1. For each Set-Top Box model Purchased during the Reporting Period, all information necessary to calculate maximum or reported TEC, including:
 - 7.1.1.1.1. Modal power use (e.g., on, sleep, scheduled sleep) and TEC;
 - 7.1.1.1.2. A feature set description sufficient to calculate the applicable allowances; and
 - 7.1.1.1.3. Details on calculating TEC and implementation of sleep states, including the number of hours scheduled sleep was set for at deployment.
 - 7.1.1.2. Different configurations of a model should be reported separately if energy use varies by configuration.
 - 7.1.1.3. Procurement information (total units Purchased by Category and units Purchased compliant with applicable Tier requirements by Category) with an attestation that the volumes reported reflect units Purchased during the Reporting Period.
 - 7.1.1.4. The weighted average TEC for each Category.
 - 7.1.1.5. Service Providers will provide attested procurement information (as defined by Section 7.1.1.3) and weighted average TEC for the subset of Non-DVR Set-Top Boxes that qualify for the IP base allowance pursuant to Annex 2 ("IP Non-DVRs), in addition to the inclusion of these devices in the overall Non-DVR Category.
 - 7.1.1.6. The Signatories agree that Vendor and Service Provider Signatories are constantly innovating their products in response to developments in service concepts and technologies, competition, and consumer demand. To foster the benefits of such innovative and competitive markets, the New Features Process set forth in Annex 6 may be invoked by the Service Provider for Set-Top Boxes with new features/functions which consume significant power that are not covered by the applicable Tier allowances.
 - 7.1.2. The information in the annual statement shall include the number of residential multichannel video subscribers served during the Reporting Period, with an indication of the "as of" date.
 - 7.1.3. Service Providers are invited to report information to the Independent Administrator that can help to describe trends and progress in improving the energy efficiency of Set-Top Boxes and promoting apps as an alternative means of access to a Service Provider's video services.
 - 7.1.4. It would be counterproductive to the objectives of energy and resource efficiency to require the disposal of device components that had been purchased by a Signatory prior to the date on which new Tier allowances become effective. Accordingly, a Signatory that purchases substantially all of the core components of a Set-Top Box model prior to taking delivery of the assembled device may choose to report such device in the year of its purchase of such components or may report such devices separately in the year of its receipt but request application of Tier allowances applicable at the time of the last material purchase of such components.

- 7.1.5. Service Providers shall provide an annual statement for the 2028 Reporting Period by April 1, 2029, notwithstanding any expiration of the Voluntary Agreement.
- 7.1.6. A recommended annual statement template shall be approved by the Steering Committee.
- 7.2. By May 1 of each year, NCTA and the Consumer Technology Association (CTA) shall provide a report to the Independent Administrator with information that may be relevant to annual report, which shall include, at a minimum, the estimated total number of U.S. residential multichannel video subscribers served by all Service Providers (including those outside of the Voluntary Agreement) during the Reporting Period. NCTA and CTA shall provide this information for the 2028 Reporting Period notwithstanding any expiration of the Voluntary Agreement.
- 7.3. A Reporting Period covers a single calendar year.
- 7.4. All reporting arrangements shall protect the confidentiality of commercially sensitive information. The Independent Administrator must sign a confidentiality agreement in relation to any confidential information supplied by the Signatories.
- 7.5. Service Providers shall provide their subscribers and potential customers with reasonable access to energy efficiency information about the Set-Top Boxes subject to this Voluntary Agreement. For any new Service Provider Signatories, this commitment will become effective six months after signature.
 - 7.5.1. The energy efficiency information that the Service Provider shall make available under this section shall include modal power use (e.g., on, sleep, scheduled sleep) and TEC for each model of Set-Top Box Purchased after the later of January 1, 2014 or the date the Service Provider signed the Voluntary Agreement.
 - 7.5.2. Different configurations of a model should be reported separately if energy use varies by configuration.
 - 7.5.3. This information need not be updated for software and/or configuration changes unless changes significantly affect energy use.
 - 7.5.4. This information shall be made publicly available for each such model as such models are made available to the Service Provider's subscribers.
 - 7.5.5. The information need not include confidential or commercially sensitive information, such as features that have not been publicly announced.
 - 7.5.6. The Independent Administrator shall at least annually verify that the information required by this Section 7.5 is posted and is readily accessible to consumers. If the Independent Administrator is not able to verify that the Service Provider has satisfied its commitment, it shall request a report from the Service Provider demonstrating satisfaction of the commitment. If the Independent Administrator finds that there has been insufficient improvement within 60 days of its request, it shall report that finding to the Steering Committee.
- 7.6. The Independent Administrator will aggregate and compile the confidential data submitted by Signatories and shall publish a public annual report that will:
 - 7.6.1. Identify participating parties during the Reporting Period.
 - 7.6.2. Identify the aggregate number of video customers served by Service Provider Signatories compared with the number of U.S. residential multichannel video subscribers served by all Service Providers (including those outside of the Voluntary Agreement) during the Reporting Period.
 - 7.6.3. Report efficiency gains under the Voluntary Agreement.

- 7.6.4. Report percentage of Set-Top Boxes that meet the applicable Tier levels, which shall be provided only on an aggregate basis.
- 7.6.5. Report aggregated TEC on a purchases-weighted basis by Category (and also separately for IP Non-DVRs), provided that aggregation must be sufficient so that no individual company's results can be deduced or reasonably approximated.
- 7.6.6. Include a summary of the results of annual verification testing conducted pursuant to Section 8.3.
- 7.6.7. Include a narrative of trends, such as overall progress under the Voluntary Agreement and changes in the total estimated energy usage of Set-Top Boxes.
- 7.6.8. Include an Appendix of Set-Top Box models which Service Providers have Purchased during the Reporting Period including their model number, features, modal power use (On and Sleep) and TEC.
- 7.7. To preserve confidentiality, any such annual report produced by the Independent Administrator in connection with the information supplied by any individual Signatory shall not refer to the performance of individual Signatories or provide information from which an individual company's results can be deduced or reasonably approximated. The Independent Administrator's report shall not include confidential or commercially sensitive information, such as shipping and volume reports and features that have not been publicly announced.
- 7.8. The Independent Administrator shall publish an annual report for the 2028 Reporting Period, notwithstanding any expiration of the Voluntary Agreement.

8. Audit and Verification

- 8.1. Either the Independent Administrator or an independent auditor approved by the Steering Committee will conduct an audit of procurement figures reported by one Service Provider selected at random each year. The same Service Provider shall not be randomly selected two years in a row.
- 8.2. In addition, on request of the Steering Committee, the Independent Administrator shall instruct an independent auditor approved by the Steering Committee to conduct an audit of the information and test results supplied by any Service Provider's annual statement. Commercially sensitive information with respect to an individual Signatory, as designated by that Signatory, shall remain confidential both during and after the audit. Signatories agree to provide reasonable assistance to the auditor. The independent auditor must sign a confidentiality agreement in a form reasonably satisfactory to the Signatory. The Steering Committee shall bear the cost of such audit.
- 8.3. The Independent Administrator will randomly select one model from each Service Provider's annual report from each Category of Set-Top Boxes, if any, that meets the energy efficiency levels of the applicable Tier for verification testing. The Independent Administrator may in its discretion exclude from selection any model that was successfully previously tested pursuant to this section in a prior year. Verification testing shall be conducted by, or under the observation of, a qualified third party approved by the Independent Administrator, which shall seek the recommendation of the Steering Committee. Verification testing must be conducted using the Test Method as defined in Annex 1 and may occur in the Signatory's lab or a third-party lab. The cost of verification testing shall be borne by the Service Provider.

9. Steering Committee

- 9.1. A Steering Committee will provide administrative functions regarding the operation of the Voluntary Agreement, and it shall not have any authority to direct the commercial functions of any Signatory.
- 9.2. Each Signatory, NCTA and CTA may designate a representative to the Steering Committee and alternate representatives that may attend meetings and vote in the absence of the representative. A Signatory may replace its representatives on notice.
- 9.3. The Steering Committee will elect a Chair from among its Members.
- 9.4. The Chair will be responsible for convening the Steering Committee meetings at least once each calendar year, and for running meetings of the Steering Committee.
- 9.5. At the request of any Signatory, the Chair may authorize any person to attend meetings of the Steering Committee as a non-voting observer.
- 9.6. The Steering Committee may adopt rules of procedure and administration. At a minimum, such rules will provide that all Members will be provided with at least ten (10) days' prior written notice of meetings of the Steering Committee or any sub-committee or any other groups acting in accordance with this Voluntary Agreement, that an agenda will be circulated sufficiently before the meeting to be reviewed by counsel, that no substantive vote will occur unless the subject of the vote was included in such prior notice, and that written minutes as to all topics of discussion be recorded, approved by all committee Members, and retained. In lieu of the above procedures, the Steering Committee may also vote in writing, or conduct a vote on less than ten days' notice, provided that all Members cast a vote and that the Committee's action is recorded in the book of minutes.
- 9.7. The Steering Committee may delegate any of its functions under the Voluntary Agreement to specific individuals or to subcommittees established by the Chair. Any actions by such individuals or subcommittees may be appealed to the full Steering Committee.
- 9.8. The Steering Committee shall designate an Independent Administrator to be responsible for the collection and processing of information supplied directly or indirectly by Signatories and determining a Signatory's satisfaction of its commitments under the Voluntary Agreement.
- 9.9. The costs of operating the Steering Committee shall be allocated in cost-recovery only annual dues set by the Steering Committee and assessed equally on each Commercial Signatory.
- 9.10. The Steering Committee will seek regular consultation and engagement with the official representatives of the Department of Energy, the Environmental Protection Agency, appropriate state regulatory authorities, and other stakeholders to provide updates regarding the implementation of this Agreement. Such meetings will include a representative from the Energy Advocates.

10. Amendment of the Voluntary Agreement

- 10.1. The Members of the Steering Committee will negotiate in good faith when considering amendments to the Voluntary Agreement.
- 10.2. A proposed amendment will be adopted if (1) there is at least agreement of two-thirds of the Service Provider Members; (2) the two-thirds includes at least one Member of each of the three industry groups of Service Providers (cable, satellite, and telephone) covered by the Voluntary Agreement; and (3) there is agreement by a majority of all voting Members.
- 10.3. Once an amendment to the Voluntary Agreement has been adopted by the Steering Committee, the Voluntary Agreement will be amended with the newly adopted amendment taking effect on

the next anniversary of the Effective Date or such other date as may be adopted with the amendment.

11. Independent Administrator Evaluation

- 11.1. Satisfaction of a Service Provider's commitments under the Voluntary Agreement shall be assessed by the Independent Administrator based upon data for the most recently completed Reporting Period on the basis of the information provided by each Signatory and data collected under the audit and verification testing programs described in Section 8. The Independent Administrator will provide written notice of a missed commitment to the Signatory with at least a thirty-day opportunity to respond and demonstrate satisfaction of the commitments. If the Independent Administrator thereafter confirms a commitment was missed, it shall request the Service Provider to propose a remedial plan within ninety days.
- 11.2. The Independent Administrator will provide its evaluation of the proposed remedial plan to a review panel that consists of the NCTA, CTA, and Energy Advocate Members of the Steering Committee. The plan must be approved by the review panel by a majority vote that must include at least one Energy Advocate. Service Providers will be afforded flexibility to develop remedial plans using any reasonable and appropriate means to fulfill the remediation plan while also meeting their business objectives. The Independent Administrator will monitor the implementation of approved remedial plans through their completion.
- 11.3. A Signatory may appeal any decision or action of the Independent Administrator under the Voluntary Agreement to the review panel described in Section 11.2.
- 11.4. In evaluating satisfaction of commitments under the Voluntary Agreement or a remedial plan, a Service Provider shall be credited for alternative energy efficiency steps which the Service Provider demonstrates will provide net energy efficiency gains in the delivery of content that are equal or superior to those required by the Voluntary Agreement.
- 11.5. A Signatory that fails to fulfill its remedial plan or that does not timely pay dues established under Section 9.9 may have its Signatory status terminated by a mutual decision of the Independent Administrator and Energy Advocate Signatories. Such termination constitutes the sole remedy with respect to any alleged noncompliance with any commitment, term, provision or obligation of the Voluntary Agreement by a Signatory.

12. Termination

- 12.1. Any Signatory may terminate its Signatory status on written notice to the Chair of the Steering Committee. Such termination shall immediately terminate all of that Signatory's rights and obligations under the Voluntary Agreement except that all confidentiality obligations arising from this Voluntary Agreement shall survive such termination.
- 12.2. The Chair of the Steering Committee will notify all Members of the Steering Committee and such other persons as the Chair may deem appropriate of the termination of any Signatory.
- 12.3. If Service Providers depart from the Voluntary Agreement and the remaining Service Provider Signatories serve fewer than 85% of the U.S. residential multichannel video subscribers served by Service Providers, then the Energy Advocates may, after no less than ninety days during which the Energy Advocates shall engage in good faith discussions with the Steering Committee to address their concerns, jointly terminate the Signatory status of all of the Energy Advocates and advocate for regulatory solutions. Such termination shall be indicated by giving twenty-eight days' written notice, signed by all Energy Advocates, to the Chair of the Steering Committee. Such termination shall immediately terminate all of the Energy Advocates' rights and obligations under the Voluntary Agreement except that all confidentiality obligations shall survive such termination.

- 12.4. The Energy Advocates may also jointly terminate their Signatory status if industry commitments in the Voluntary Agreement are not being performed in good faith, or changes in the Voluntary Agreement are not faithful to the purposes of the Voluntary Agreement and consistent with the justified expectations of all Signatories. The Energy Advocates may terminate under this provision, after no less than ninety days during which the Energy Advocates shall engage in good faith discussions with the Steering Committee to address their concerns. Such termination shall be indicated by giving written notice, signed by all Energy Advocates, to the Chair of the Steering Committee. Such termination shall immediately terminate all of the Energy Advocates' rights and obligations under the Voluntary Agreement except that all confidentiality obligations arising from this Voluntary Agreement shall survive such termination.

13. Voluntary Agreement Commitments as an Alternative to Regulatory Approaches

- 13.1. Each Signatory will use its best efforts to promote the Voluntary Agreement as an effective alternative to any U.S. Federal and State energy regulation of Set-Top Boxes used by Service Providers, and will discourage initiation of new regulations or legislation covering Set-Top Box energy use by any Federal or State authority.
- 13.2. All commitments of Signatories are contingent on the continued absence of all U.S. Federal and State regulations covering energy use of Set-top Boxes used by Service Providers, unless otherwise mutually agreed by the Signatories.

14. Term

- 14.1. The initial term of this Voluntary Agreement began on January 1, 2013. In 2025, the Voluntary Agreement was extended through December 31, 2028, provided that the reporting commitments shall continue until the 2029 publication of the annual report for 2028.
- 14.2. The Voluntary Agreement may be renewed by mutual agreement.

15. Miscellaneous

- 15.1. Force Majeure. If a Signatory is prevented or delayed in performance of its commitments hereunder as a result of circumstances beyond such Signatory's reasonable control, including, without limitation, Acts of God, war, terrorism, acts of the government, epidemics, or failure of suppliers, subcontractors, or carriers, such failure or delay will not be deemed to constitute failure to meet a commitment under the Voluntary Agreement.
- 15.2. Legal Effect. The Voluntary Agreement sets out a course of action for each Signatory to improve the energy efficiency of Set-Top Boxes. The Voluntary Agreement is not a commercial agreement and does not in itself create any contractual relationship, partnership, joint venture or other agency relationship among the Signatories. Nothing in this Voluntary Agreement shall be deemed to create a third-party beneficiary relationship. Nothing in this document shall limit a party's rights pursuant to the separate, enforceable Confidentiality Agreement related to information exchanged under this agreement.
- 15.3. Notice. All legal notices to Signatories in relation to the Voluntary Agreement should be addressed and sent to the relevant contacts specified in Annex 9. Communications to Signatories regarding the ordinary business of the Steering Committee may be sent to the email addresses provided by the Signatory.

SCHEDULE OF ANNEXES

ANNEX 1	GENERAL DEFINITIONS
ANNEX 2	TIER 4 PROGRAM REQUIREMENTS
ANNEX 6	NEW FEATURES PROCESS
ANNEX 7	SIGNATORY SIGNING FORMS
ANNEX 8	CONTACT INFORMATION (Confidential)

Annexes 3-5 are intentionally omitted and Annex 8 is not posted in the public version of the Agreement.

ANNEX 1 – GENERAL DEFINITIONS

1. “Category” means the types of Set-Top Boxes specified in the definition thereof.
2. “Commercial Signatory” means any Signatory that is not an Energy Advocate.
3. “Effective Date” means January 1, 2013, except that as applied to a Signatory that signs the Voluntary Agreement after that date, it shall mean the date on which that party signs the Voluntary Agreement.
4. “End User” means a subscriber to content services provided by a Service Provider who uses a Set-Top Box provided by the Service Provider as part of the subscription.
5. “Energy Advocates” are the Natural Resources Defense Council and the American Council for an Energy-Efficient Economy.
6. “Equipment Manufacturer” means a company or other legal entity that is responsible for designing, developing and/or manufacturing a Set-Top Box for Purchase and deployment in the United States by a Service Provider, or components thereof, or software or conditional access techniques employed by such Set-Top Boxes.
7. “Federal” includes any part of the government of United States and any department, agency or instrument thereof.
8. “Independent Administrator” means the party designated by the Steering Committee who is tasked with, and responsible for, the collection and processing of information supplied directly or indirectly by Signatories pursuant to Section 7, and determining a Signatory’s satisfaction of its commitments under the Voluntary Agreement in accordance with Section 11.
9. “Member” means a Member of the Steering Committee.
10. “Purchase” means to accept delivery of a Set-Top Box for commercial deployment in the United States.
11. “Reporting Period” means the period within which the required information is to be submitted by a Signatory (which is generally a calendar year).
12. “Service Provider” means an entity that provides video (and possibly other) content to subscribers with whom it has an ongoing contractual relationship through a cable, satellite, or other managed distribution network provided by that entity. A Service Provider in the context of the Voluntary Agreement is one that supplies Set-Top Boxes to a residential End User.
13. “Set-Top Box” means a device (1) which is capable of receiving digital television services from a coaxial, hybrid fiber coaxial, or fiber-to-the-home distribution system, from satellites, or encapsulated in IP packets from managed IP distribution networks in order to decrypt or descramble these signals and to decode/decompress for delivery to residential consumer displays and/or recording devices, and/or one or more other Set-Top Boxes or Thin Clients in a residential multi-room architecture; and (2) that is Purchased and placed into service in the United States by a Service Provider for the first time on or after the Effective Date. The Set-Top Boxes subject to this Voluntary Agreement are limited to the following Categories of Set-Top Boxes supplied by Service Providers to residential End Users:
 - a. DVR. A Set-Top Box that enables recording and playback of video content from a local hard disk drive or other integrated non-volatile storage.
 - b. Non-DVR. A Set-Top Box that does not enable recording and playback of video content from a local hard disk drive or other integrated non-volatile storage, and is not a Thin Client, Multi-Service Gateway, or DTA.

- c. Thin Client. A Set-Top Box that is designed to interface between another Set-Top Box and a TV (or other display device) over a home network and relies solely on the other Set-Top Box for access to digital video signals received from the network.
- d. Multi-Service Gateway. A device that is capable of joining multiple Service Provider delivery protocols that provisions video and at least one of voice or broadband services from a Service Provider.
- e. Cable Digital Transport Adapter (DTA). A minimally-configured unidirectional Set-Top Box without recording functionality that can receive and decode video content as delivered from a coaxial or hybrid fiber coaxial system using a Conditional Access System (CAS).

Set-Top Boxes subject to this Voluntary Agreement do not include any Set-Top Box that is Purchased for the first time before the Effective Date, including any such Set-Top Box that is returned to the Service Provider and refurbished, repaired, and/or upgraded, and then redeployed, or that is used in a “swap-for-failure” scenario after the Effective Date.

- 14. “Signatory” and “Signatories” mean those companies or organizations that sign this Voluntary Agreement as Service Providers, Vendor Signatories or Energy Advocates.
- 15. “State” includes the governments of the District of Columbia and any State, territory and insular possession of the United States and their political subdivisions; and any department, agency, or instrument thereof.
- 16. “Steering Committee” means the coordinating and governing body of this Voluntary Agreement.
- 17. “Test Method” means the test procedure as defined in ANSI/CTA-2043-B, Set-top Box (STB) Power Measurement, published by the Consumer Technology Association, or such successor standard as is approved by the Steering Committee.
- 18. “Tier 4” means the Tier 4 energy consumption targets designated in Annex 2.
- 19. “Typical Energy Consumption” or “TEC” refers to the method for evaluating energy efficiency through a calculation of expected energy consumption of a Set-Top Box over a one year period, expressed in units of kWh/year.
- 20. “Vendor Signatory” means the Equipment Manufacturers and other vendors that are Signatories pursuant to ANNEX 7, Part B Signing Forms.

ANNEX 2 - TIER 4 PROGRAM REQUIREMENTS

1. INTRODUCTION

This annex defines the base and additional feature energy allowances, allowance rules, and the Typical Energy Consumption (TEC) equation used to determine satisfaction of the procurement commitments of the Voluntary Agreement.

2. DEFINITIONS

A) Set-Top Box (STB) Base Types:

- 1) Cable (CBL): A STB that can receive and decode video content as delivered from a Service Provider hybrid fiber coaxial distribution system using a Conditional Access System (CAS).
- 2) Satellite (SAT): A STB that can receive and decode video content as delivered from a Service Provider satellite network using a Conditional Access System (CAS).
- 3) Cable Digital Transport Adapter (DTA): A minimally-configured unidirectional STB without recording functionality that can receive and decode video content as delivered from a coaxial or hybrid fiber coaxial system using a Conditional Access System (CAS).
- 4) Internet Protocol (IP): A STB that can receive and decode video content encapsulated in IP packets from a Service Provider managed distribution network.
- 5) Thin Client (TC): A STB that can receive and decode video content solely over a Home Network Interface from another STB and does not include a Service Provider network interface.

B) Client: A device (e.g., STB, Thin Client STB, Smart TV, Mobile Phone, Tablet, PC, etc.) that can receive video content over a Home Network Interface.

C) Multi-Service Gateway (MSG): A STB that is capable of joining multiple Service Provider delivery protocols and/or that provisions a video service and at least one of voice or broadband services from a Service Provider.

D) Additional Functionality:

- 1) CableCARD (CC): The capability to decrypt premium video content and services and provide other network control functions via a plug-in Conditional Access module that complies with the ANSI/SCTE 28 HOST-POD Interface Standard.¹
- 2) Digital Video Recorder (DVR): A feature that enables recording and playback of video content from a hard disk drive (HDD) or other integrated non-volatile storage. A DVR often includes features such as: Play, Record, Pause, Fast Forward (FF), and Fast Rewind (FR). STBs that only support buffering or a Service Provider network-based DVR service are not eligible for the DVR feature allowance. The presence of a DVR feature does not mean the device is defined to be a STB.
- 3) DOCSIS™: The capability to distribute data and video content over cable television infrastructure according to the following specifications:²
 - i) DOCSIS 2.0 (D2): DOCSIS 2.0 interface as defined by CableLabs® Data Over Cable Service Interface Specification.
 - ii) DOCSIS 3.0 (D3): DOCSIS 3.0 interface as defined by CableLabs® Data Over Cable Service Interface Specification.

¹ See <http://www.scte.org/standards>.

² See <http://www.cablelabs.com/specifications>.

- 4) High Definition (HD): The capability to transmit or display video signals with a minimum output resolution of 1280×720 pixels in progressive scan mode at minimum frame rate of 59.94 fps (abbreviated 720p60) or a minimum output resolution of 1920×1080 pixels in interlaced scan mode at 29.97 fps (abbreviated 1080i30).
 - 5) Advanced Video Processing (AVP): The capability to decode video signals in accordance with standards H.264/MPEG 4 or SMPTE 421M.
 - 6) Transcoding (XCD): Additional capability to translate (e.g., MPEG2 to H.264), transrate (e.g., HD bitrate to Mobile bitrate), transscale (e.g., HD resolution to Mobile resolution), transcrypt (e.g., CAS to DRM), or perform audio format conversions (e.g., AC-3 to AAC) in real-time.
 - 7) Home Network Interface (HNI): the interface with external devices over a local area network (e.g., MoCA, HPNA, IEEE 802.3, IEEE 802.11, HomePlug AV) capable of transmitting video content.
 - 8) WiFi HNI (WiFi HNI): A wireless HNI as specified by IEEE 802.11.
 - 9) Multi-Input Multi-Output WiFi (MIMO WiFi): Functionality that supports more than one Spatial Stream³ for both send and receive.
 - 10) Shared DVR (S-DVR): The capability to provide independent DVR video content to more than one Display Device and/or Client in a single-subscriber configuration.
 - 11) Multi-Room (MR): The capability to provide independent live video content to more than two Display Devices and/or Clients in a single-subscriber configuration.
 - 12) Multi-Stream (MS): The capability to receive multiple independent streams of video content for use with one or more Clients, one or more directly-connected Display Devices, a DVR, or picture-in-picture, etc., in a single-subscriber configuration.
 - 13) Routing (RTG): The capability to determine the path along which network traffic should be forwarded.
 - 14) Access Point (AP): The capability to provide wireless network IEEE 802.11 (Wi-Fi) connectivity to multiple clients.
 - 15) Ultra High Definition – 4K (UHD-4): The capability to transmit or display standard dynamic range video signals with a minimum output resolution of 3840×2160 pixels in progressive scan mode at minimum frame rate of 24 frames per second (“2160p24”).
 - 16) High Efficiency Video Processing (HEVP): Video decoding providing compression efficiency significantly higher than H.264/AVC, for example HEVC (H.265).
 - 17) Telephony: The ability to support analog telephone service through one or more RJ11 or RJ14 jacks.
- E) Auto Power Down (APD): A STB feature that monitors parameters correlated with user activity or viewing. If the parameters collectively indicate that no user activity or viewing is occurring, the APD feature enables the STB to transition to a lower power mode known as APD Mode.
- F) Principal STB Functions: Functions necessary for selecting (i.e., the electronic program guide (EPG)), receiving, decoding, decompressing, or delivering live or recorded video content to a Display Device,

³ Spatial multiplexing is a transmission technique in MIMO wireless communication used to transmit independent and separately-encoded data signals, so-called Spatial Streams, from each of the multiple transmit antennas. Therefore, the space dimension is reused, or multiplexed, more than one time. The number of receive antenna does not define the number of Spatial Streams. The common description “2 x N: 2” means 2 send streams x N antennas: 2 receive streams, where N will always be the same or larger as the largest number of streams.

local/remote recording device, or Client. Monitoring for user or network requests is not considered a Principal STB Function.

G) Operational Modes:

- 1) On Mode: The STB is connected to a power source. At least one Principal STB Function is activated and all Principal STB Functions are provisioned for use. The power consumption in ON Mode may vary based on specific use and configuration.
- 2) Sleep Mode: A range of reduced power states where the STB is connected to a power source and is not providing any Principal STB Function. The STB may transition to ON or other mode due to user action, internal signal, or external signal. The power consumed in this mode may vary based on specific use or configuration. If any Principal STB Function is activated while operating in this mode, the STB is assumed to transition to On Mode. The STB shall be able to transition from this mode to On Mode within 30 seconds.
- 3) Deep Sleep Mode: Deep Sleep represents the lowest average power consumption state where Principal STB Functions can be re-activated without user action and without the transition time requirement of Sleep Mode. Deep Sleep Mode may be entered and exited on a user-configurable schedule. A Deep Sleep Mode that is entered and exited on a schedule is also referred to as "Scheduled Sleep Mode."
- 4) APD Mode: If the parameters collectively indicate that no user activity or viewing is occurring, the APD feature enables the STB to transition to Auto Power Down Mode, which may be similar to Sleep Mode.

H) Other Definitions:

- 1) Display Device (DD): A device (e.g., TV, computer monitor, or portable TV) that receives its content directly from a STB through a video interface (example: High-Definition Multimedia Interface (HDMI), Component Video, Composite Video, or S-Video), not through a HNI, and displays it for viewing.
- 2) Conditional Access System (CAS): The encryption, decryption, and authorization techniques employed to protect content from unauthorized viewing. CableCARD and Downloadable Conditional Access System (DCAS) are examples of Conditional Access technology.

3. EFFICIENCY CRITERIA

A) Significant Digits and Rounding

- 1) All measured and calculated power values shall be rounded as follows:
 - i) To the nearest 0.01 W for power measurements of 10 W or less.
 - ii) To the nearest 0.1 W for power measurements of greater than 10 W and up to 100 W.
 - iii) To the nearest 1 W for power measurements of greater than 100 W.
- 2) All measured and calculated TEC values shall be rounded as follows:
 - i) To the nearest 0.01 kWh/year for values of 10 kWh/year or less.
 - ii) To the nearest 0.1 kWh/year for values of greater than 10 kWh/year and up to 100 kWh/year.
 - iii) To the nearest 1 kWh/year for values of greater than 100 kWh/year.

B) General Qualification Criteria

- 1) Device Operation Requirements:

- i) Products may automatically exit Sleep Mode or Deep Sleep Mode on a regular schedule to perform maintenance activities. Maintenance activities may include, but are not limited to; software updates, electronic programming guide updates, HDD maintenance, and routine diagnostic operations.
- ii) Products that automatically exit Sleep Mode or Deep Sleep Mode and have completed maintenance or other user-requested activities (e.g., user pre-scheduled recording) shall automatically return to Sleep Mode or Deep Sleep Mode in less than 15 minutes.
- iii) Products that provide a default (no user opt-in) speculative recording function shall provide a user-accessible menu option to permit users to disable the functionality. Instructions for disabling speculative recording shall be made available to the user.
- iv) Energy-related default settings shall persist until an end-user chooses to disable or modify the default settings.
- v) Products represented as offering an APD feature shall meet the following requirements:
 - (1) STBs shall be deployed with APD enabled by default, with APD timing set to engage after a period of inactivity less than or equal to 4 hours.
 - (2) Otherwise, at time of installation the Service Provider shall enable APD timing to engage after a period of inactivity less than or equal to 4 hours. The Service Provider may vary these settings in order to provide a good customer experience but the average APD timeout period must be less than or equal to 4 hours.
 - (3) Products that provide an APD feature should provide a user-accessible menu option to permit users to modify or disable the functionality.
 - (4) Products that provide an APD feature shall not provide the ability to disable the APD functionality with a single-button press from the APD timeout notification screen such that the disabled APD state is persisted.
- vi) Products represented as offering a Deep Sleep Mode shall meet the following criteria:
 - (1) STBs shall be deployed with automatic Deep Sleep Mode enabled by default.
 - (2) Otherwise, at time of installation the Service Provider shall enable automatic Deep Sleep Mode.
 - (3) Products that provide a Deep Sleep Mode should provide a user-accessible menu option to permit users to modify or disable the functionality.
 - (4) Products that provide a Deep Sleep feature shall not provide the ability to disable the Deep Sleep functionality with a single-button press from a timeout notification screen such that the disabled Deep Sleep state is persisted.

C) Maximum Typical Energy Consumption Calculation

- 1) Maximum TEC: The maximum TEC to qualify toward the procurement commitment of the Voluntary Agreement is the sum of the specified STB Base type allowance and the sum of all applicable Additional Functionality Allowances as defined in

2) Equation 1.

Equation 1: Maximum TEC

$$TEC_{MAX} = TEC_{BASE} + \sum_{1}^i TEC_{ADDL_i}$$

Where:

TEC_{BASE} is the Base Type Allowance (kWh); and

TEC_{ADDL_i} is each applicable Additional Functionality Allowance (kWh).

3) **Base Allowances shall be as specified in Table 1:**

If a STB supports more than one base type definition, then the topmost base type listed in Table 1 must be used to classify the device.

Table 1: Base Type TEC Allowances

Base Type (use Topmost if Multiple Apply)	Tier 4 Allowance (kWh/yr)
Cable DTA (DTA)	40
Cable (CBL)	45
Satellite (SAT)	50
Internet Protocol (IP)	15
Thin Client (TC)	25

4) **Additional Functionality Allowances shall be as specified in Table 2, subject to the following usage rules:**

- i) Each Additional Functionality Allowance shall be used at most **once per STB** unless otherwise specified.
- ii) **DTA** base type shall only use the **HD, AVP, HNI, UHD-4, and HEVP** allowances, if applicable.
- iii) **TC** base type shall only use the **HD, AVP, HNI, WiFi HNI, MoCA HNI, MIMO WiFi, UHD-4, HEVP, and RTG** allowances if applicable.
- iv) One **AVP** allowance shall be used only for a second decoder that is active during the On Mode test.
- v) **CableCARD** allowance shall be used for each CableCARD up to a maximum of two (2).
- vi) **DVR** allowance shall not be used with STB types that only support buffering or a Service Provider network-based “DVR” service and do not use a hard disk drive (HDD) or other integrated non-volatile storage.
- vii) **DVR-A** allowance may be applied to DVR STBs with a 3.5 inch hard disk drive with 1 terabyte (TB) of storage or greater, for each full TB of integrated storage up to a maximum of 2 TB, in addition to the **DVR** allowance.
- viii) Either **DOCSIS 2.0 (D2)** allowance OR **DOCSIS 3.0 (D3)** allowance, but not both, shall be used if applicable.
- ix) **DOCSIS 3.0 (D3)** allowance is applicable to all DOCSIS 3.0 configurations.

- x) **DOCSIS 3.0 above 8x4 (D3 above 8x4)** allowance is an additional allowance (to D3), applicable to DOCSIS 3.0 configurations with more than 8 DS channels. One “D3 above 8x4” allowance shall be taken for each additional bundle of 4 DS channels above 8 up to and including 32 DS channels.
- xi) Either **Shared DVR (S-DVR)** allowance OR **Multi-Room (MR)** allowance, but not both, shall be used if applicable.
- xii) Either **Multi-Room (MR)** allowance OR **Home Network Interface (HNI)** allowance, but not both, shall be used if applicable.
- xiii) **MoCA HNI (M-HNI)** allowance is used in addition to the **MR** allowance or **HNI** allowance and shall only be used if the interface is providing video content during the qualification test (e.g., if a **MoCA HNI** provides video content to Clients during the qualification test, then the MoCA HNI allowance may be taken).
- xiv) **Multi-Stream (MS)** allowance shall be used for devices receiving two (2) video content streams during the qualification test.
- xv) **Multi-Stream Additional (MS-A)** allowance is used in addition to the **MS** allowance. One **MS-A** allowance shall be used for devices receiving greater than two (2) and, up to and including, eight (8) video streams, and two **MS-A** allowances apply to STBs with more than eight (8) and up to sixteen (16) streams.
- xvi) **Transcoding Base (XCD)** allowance shall be used if the device includes a transcoding feature in addition to the basic video decoding required for directly connected Display Devices.
- xvii) **Transcoding Additional (XCD-A)** allowance is additive to **Transcoding Base (XCD)** and shall be used once for each actively transcoded video stream during the qualification test.
- xviii) **Routing (RTG)** allowance is applicable (except as limited by sections xix) and xx) below) if the device is providing IP routing functionality, forwarding IP data packets from one IP network to another as part of a high-speed data service or providing mesh networking functionality that extends Wi-Fi Internet access associated with a residential high speed data service. Routing of IP video packets that is not part of a high-speed data service is considered a new feature that does not have an energy allowance and is subject to the new feature allowance setting process set forth in Annex 6.
- xix) Either **Routing** OR the **Access Point** allowance, but not both, shall be used if applicable.
- xx) Either a **Routing** OR one or more **D3 above 8x4** allowances, but not both, shall be used if applicable.
- xxi) **UHD-4** can be taken once per STB.
- xxii) **HEVP** can be taken once per STB.
- xxiii) The following additional Tier 4 rules apply as of January 1, 2023 to newly designed IP base type Non-DVR STB models purchased for the first time by any Signatory after December 31, 2020:
 - (1) These newly designed models shall not be eligible for the Home Network Interface **HNI** allowance if the model has a Wi-Fi interface and does not have a MoCA interface.
 - (2) The **HEVP** allowance for these newly designed models shall be limited to 5 kWh/yr.

Table 2: Additional Functionality TEC Allowance (TEC_{ADDL_i})

Additional Functionality	Descriptor	Tier 4 Allowance (kWh/yr)
Advanced Video Processing (second active decoder)	AVP	8
Multi-Stream (1 < received streams ≤ 2)	MS	8
Multi-Stream Additional (first MS-A allowance for 3-8 streams; second allowance for 9-16 streams) (max 2)	MS-A	8*
Transcoding	XCD	13
Transcoding Additional (per tested stream transcoded)	XCD-A	5*
CableCARD (per CableCARD, max 2)	CC	10*
DOCSIS 2.0	D2	20
DOCSIS 3.0	D3	40
DOCSIS 3.0 additional downstream channels (for every additional 4 downstream channels in excess of 8 up to and including 32)	D3 above 8x4	11*
Digital Video Recorder	DVR	15
DVR 3.5” hard disk drive (per 1 TB storage, max 2)	DVR-A	10*
Shared DVR	S-DVR	20
Multi-Room	MR	20
Home Network Interface	HNI	10
MoCA HNI	M-HNI	12
Wi-Fi IEEE 802.11n radio at 2.4 GHz or at 5.0 GHz with a conducted output power less than 200 mW per chain (up to 2x2, i.e. 400 mW)	Wi-Fi (n) LP	9*
Wi-Fi, IEEE 802.11ac radio at 5 GHz with a conducted output power less than 200 mW per chain (up to 2x2, i.e. 400 mW)	Wi-Fi (ac) LP	16*
Additional allowance per RF chain above a 2x2 MIMO configuration (e.g., for 3x3 and 4x4) with a conducted output power less than 200 mW per chain	Wi-Fi above 2x2 LP	3*
Wi-Fi IEEE 802.11n radio at 2.4 GHz or at 5.0 GHz with a conducted output power greater than or equal to 200 mW per chain (up to 2x2, i.e. 400 mW)	Wi-Fi (n) HP	10*
Wi-Fi, IEEE 802.11ac radio at 5 GHz with a conducted output power greater than or equal to 200 mW per chain (up to 2x2, i.e. 400 mW)	Wi-Fi (ac) HP	20*
Additional allowance per RF chain above a 2x2 MIMO configuration (e.g., for 3x3 and 4x4) with a conducted output power greater than 200 mW per chain	Wi-Fi above 2x2 HP	3*
Routing	RTG	27
Access Point	AP	8
High Efficiency Video Processing	HEVP	10, 5**
Ultra High Definition – 4K	UHD-4	5
Telephony	TELE	4
* Indicates allowance may be used more than once		
** See usage rule xxiii) above		

D) **Measured Typical Energy Consumption Requirements:** The measured values derived from Section 4 below are used in combination with the TEC equation to calculate the $TEC_{MEASURED}$ value for the device.

- 1) Measured TEC ($TEC_{MEASURED}$) shall be less than or equal to the Maximum TEC (TEC_{MAX}), as calculated using Equation 1.
- 2) $TEC_{MEASURED}$ shall be calculated using Equation 2.

Equation 2: Measured TEC

$$TEC_{MEASURED} = 0.365[(T_{WATCH_TV} \times P_{WATCH_TV}) + (T_{SLEEP} \times P_{SLEEP}) + (T_{APD} \times P_{APD}) + (T_{SCHED_SLEEP} \times P_{SCHED_SLEEP})]$$

Note: The maximum value for T_{SCHED_SLEEP} is four (4) hours for the purposes of this program. To claim Scheduled Sleep the device must transition to and from Scheduled Sleep Mode automatically when in the as-deployed configuration.

Where:

- T_{WATCH_TV} is the time coefficient for On Mode, as determined per Table 3;
- P_{WATCH_TV} is the measured power in On Mode (W);
- T_{SLEEP} is the time coefficient for Sleep Mode, as determined per Table 3;
- P_{SLEEP} is the measured power in Sleep Mode (W);
- T_{APD} is the time coefficient for APD, as determined per Table 3;
- P_{APD} is the measured power after an APD timeout (W);
- T_{SCHED_SLEEP} is the time operating in Scheduled Sleep Mode time (maximum of 4h); and
- P_{SCHED_SLEEP} is the measured power in Scheduled Sleep Mode (W).

- 3) Operational Mode Durations for use with Equation 2 are specified in Table 3:

Table 3: Operational Mode Durations

APD Enabled by Default	Automatic Scheduled Sleep	T_{WATCH_TV}	T_{SLEEP}	T_{APD}	T_{SCHED_SLEEP} ($T_{SCHED_SLEEP} \leq 4 \text{ h}$)
NO	NO	14	10	0	0
NO	YES	14	10 – T_{SCHED_SLEEP}	0	T_{SCHED_SLEEP} as-deployed duration
YES	NO	$7 - \frac{4 - T_{APD_SETTING}}{2}$	10	$7 + \frac{4 - T_{APD_SETTING}}{2}$	0
YES	YES	$7 - \frac{4 - T_{APD_SETTING}}{2}$	10 - T_{SCHED_SLEEP}	$7 + \frac{4 - T_{APD_SETTING}}{2}$	T_{SCHED_SLEEP} as-deployed duration

Note: $T_{APD_SETTING}$ is the configured APD timeout value in the device. Default APD timeout durations of less than 4h are given a 50% credit toward reduction of the T_{WATCH_TV} 7h duration. The 7h is the sum of 5h, accounting for the national average TV watching time, and 2h, assuming 50% of users shut off the TV but leave the STB on which causes APD to trigger after the default 4h duration resulting in the addition of 2h to national TV watching time per day. The reduction of the APD timeout results in a reduction in T_{WATCH_TV} .

4. TEST CRITERIA

A) Test Method:

The ANSI/CTA-2043-B: Set-top Box (STB) Power Measurement standard, as published in April 2025 by the Consumer Technology Association, will be used for all required power measurement values. The Steering Committee may approve the use of subsequent versions of ANSI-CTA-2043-B or a successor standard, and modifications to the test method pursuant to Annex 6.

B) Number of Units Required for Testing:

- 1) A product configuration equivalent to that which is intended to be marketed is considered a Representative Model.
- 2) A single unit of each Representative Model shall be selected for testing. If the resulting $TEC_{MEASURED}$ is within 5% of the TEC_{MAX} requirement, two (2) additional units of the same Representative Model with an identical configuration shall be tested.
- 3) All tested units shall be less than or equal to the TEC_{MAX} for the device configuration to meet the requirements.

C) Configuration Testing Rules:

- 1) STBs offering more than one integrated Service Provider (SP) network interface option at time of installation may either be tested with each combination of SP network interface and each result reported under a different STB sub-model or the STB may be tested using the SP interface priority as specified in Table 4 and reported once under the primary model number. This table may not apply to TC STB types.

Table 4: Service Provider Network Interface Priority

Connection (Protocol)
1. Coax (QAM/DOCSIS)
2. Coax (SAT/MoCA)
3. Coax (QAM/MoCA)
4. Wi-Fi (802.11)
5. Coax (HPNA)
6. Ethernet (802.3)
7. Other

- 2) STBs capable of receiving video over more than one integrated HNI option at time of installation may either be tested with each HNI network interface and each result reported under a different STB sub-model or the STB may be tested using the HNI connection priority as specified in Table 5 and reported once under the primary model number.

Table 5: HNI Priority

Connection (Protocol)
1. MIMO Wi-Fi HNI
2. Wi-Fi HNI
3. Coax (MoCA)
4. Coax (HPNA)
5. HomePlug AV
6. Ethernet (802.3)
7. Other

- 3) STBs offering concurrent operation of integrated HNIs at time of installation must be tested with the HNIs providing video content.
- 4) STBs claiming the **Multi-Room (MR)** allowance must be tested with three (3) live video streams with at least one (1) Client (receiving live video) in addition to locally connected Display Devices, if supported. If three (3) live streams are not supported the MR allowance may not be used.
- 5) STBs claiming the **Shared DVR (S-DVR)** allowance must be tested with two (2) independent DVR video streams serving one of the following configurations:
 - i) One directly connected Display Device and one Client.
 - ii) Two directly connected Display Devices.
 - iii) Two Clients.
- 6) Set-top Boxes claiming the **RTG** allowance must be tested with routing enabled.

ANNEX 6

NEW FEATURES PROCESS

1.0 Purposes

- 1.1 This new features process is intended to encourage innovation and competition by Service Providers and Vendor Signatories and also to encourage energy efficiency by design.
- 1.2 This new features process is intended to provide a path for Service Providers and Vendor Signatories to innovate and add new features, including features with no assigned allowances and features that are in the early stages of design, without being treated as in violation of Voluntary Agreement energy allowances or procurement commitments. For example, during the initial Term of the Voluntary Agreement, this process was used to adopt new feature Tier 2 allowances for High Efficiency Video Processing, Ultra HD, and VOIP functionality included in a Set-Top Box.
- 1.3 This new features process is intended to assure that most Set-Top Boxes remain under the procurement commitments of the Voluntary Agreement, with sufficient transparency for appropriate allowances to be established for new features.

2.0 Allowances

- 2.1 If a Service Provider deploys a Set-Top Box that includes a new feature with no allowance, and the presence of the feature causes the Set-Top Box to exceed the TEC_{MAX} as defined in equation 1, the Service Provider will set and report an appropriate initial allowance for the power consumption of that feature when it reports the device under the Voluntary Agreement.
- 2.2 The initial allowance will be reported within nine months of the initial deployment of such a Set-Top Box if the Service Provider expects that its percentage of procurement of such Set-Top Box will be sufficient to be reported in its next annual statement.
- 2.3 The initial allowance will represent the Service Provider's best estimate of the amount of energy consumed by the new feature in that particular unit. All new features, associated initial allowances, and justifications for such allowance, will be submitted to the Independent Administrator together with other required testing data. The Independent Administrator shall inform the Steering Committee of the Service Provider created allowance for the new feature, except as otherwise provided in Section 2.4 of this Annex.
- 2.4 If the new feature is confidential and the Service Provider seeks an allowance, the Service Provider shall confidentially report the initial allowance, the basis for the allowance, and a written justification for its confidentiality to the Independent Administrator. The new feature may remain confidential until the feature is marketed or otherwise made public. The Service Provider shall inform the Independent Administrator within thirty days of marketing or otherwise making public a previously confidential new feature. In no case may a new feature remain confidential for purposes of this agreement, for longer than eighteen months from initial deployment. Once a new feature is reported as public information or the eighteen-month period has elapsed, the Independent Administrator shall inform the Steering Committee of the Service Provider created allowance for the new feature. Annual reports presented by the Independent Administrator should include the total energy use of Set-Top Boxes that include confidential new features but need not identify the new feature.

- 2.5 When the information is reported to the Steering Committee, the Steering Committee shall propose appropriate allowances and effective dates when the allowances would go into effect under the processes of Voluntary Agreement. Initial allowances set by the Steering Committee will reflect the Steering Committee's best estimates of the energy consumption required for systems incorporating the new feature to meet the levels of the applicable Tier. Initial allowances shall be set within six months of submission and become effective at such time as is prescribed by the Steering Committee.
- 2.6 If a Service Provider includes in its report to the Independent Administrator a Set-Top Box that it has Purchased but has not yet deployed that includes a new feature with no allowance, and the presence of the feature causes the Set-Top Box to exceed the TEC_{MAX} as defined in equation 1, the Service Provider may report a provisional Service Provider created allowance until an initial allowance is submitted after deployment.
- 2.7 Allowance setting would be designed to not prejudice a variety of implementations. If a new feature is specific to one particular industry group (cable, satellite, and telephone) and its energy consumption when applied to other industry groups is undetermined, it may be adopted for application solely to that particular industry group. The process for adopting a level for that feature will apply to other industry groups when one of its Service Provider members submits an allowance for that feature to the Independent Administrator.
- 2.8 Allowances established by the Steering Committee for a new feature would be publicly reported as are other such allowances under the Voluntary Agreement.
- 2.9 The Steering Committee may adopt appropriate modifications to the Test Method and/or additional rules governing the applicability of new feature allowances.

ANNEX 7, Part A – SERVICE PROVIDER SIGNING FORMS

The undersigned Signatories agree to the Voluntary Agreement as Cable Operators.

Altice USA, Inc.

Signature: /s/ Michael Olsen
Name: Michael Olsen
Title: SVP Legal
Date: January 1, 2019

Cablevision Systems Corp.

Signature: /s/ Yvette Kanouff
Name: Yvette Kanouff
Title: EVP – Corporate Engineering & Technology
Date: November 30, 2012

Charter Communications, Inc.

Signature: /s/ Jay Rolls
Name: Jay Rolls
Title: SVP & CTO
Date: November 29, 2012

Comcast Cable Communications, LLC

Signature: /s/ Tony Werner
Name: Tony Werner
Title: EVP & CTO
Date: November 30, 2012

Cox Communications, Inc.

Signature: /s/ Kevin T. Hart
Name: Kevin T. Hart
Title: Executive Vice President & Chief Technology Officer
Date: November 29, 2012

The undersigned Signatories agree to the Voluntary Agreement as Telephone Company Service Providers.

AT&T Services, Inc.

Signature: /s/ Nolan Daines
Name: Nolan Daines
Title: SVP
Date: November 30, 2012

Frontier Communications Corporation

Signature: /s/ Steve Gable
Name: Steve Gable
Title: Executive Vice President and Chief Technology Officer
Date: October 11, 2017

Verizon Communications, Inc.

Signature: /s/ James J Gowen
Name: James J Gowen
Title: Vice President Supply Chain Operations / Chief Sustainability Officer
Date: November 30, 2012

The undersigned Signatories agree to the Voluntary Agreement as Satellite Service Providers.

DirecTV, LLC

Signature: /s/ Rômulo Pontual
Name: Rômulo Pontual
Title: EVP and CTO
Date: November 30, 2012

DISH Network LLC

Signature: /s/ Stanton Dodge
Name: Stanton Dodge
Title: EVP & General Counsel
Date: November 30, 2012

ANNEX 7, Part B – VENDOR SIGNING FORMS

The undersigned Signatories agree to the Voluntary Agreement.

Sagemcom Broadband SAS

Signature: /s/ Olivier Taravel
Name: Olivier Taravel
Title: CEO, Audio Video Solutions
Date: March 16, 2022

Technicolor Connected Home USA LLC d/b/a Vantiva

Signature: /s/ Luis Martinez-Amago
Name: Luis Martinez-Amago
Title: President
Date: February 25, 2016

ANNEX 7, Part C – ENERGY ADVOCATE SIGNING FORMS

The undersigned Signatories agree to the Voluntary Agreement as Energy Advocates.

American Council for an Energy-Efficient Economy and the Appliance Standards Awareness Project

Signature: /s/ Naomi Baum
Name: Naomi Baum
Title: Chief Operating Officer, ACEEE
Date: December 19, 2013

Natural Resources Defense Council

Signature: /s/ Noah Horowitz
Name: Noah Horowitz
Title: Senior Scientist and Director - NRDC Center for Energy Efficiency Standards
Date: December 19, 2013