

**Voluntary Industry Agreement to improve the energy consumption
of Complex Set Top Boxes within the EU**

**Proposal from the industry group, Version 4.0
16th July 2015**

DRAFT

TABLE OF CONTENTS

1 INTRODUCTION 3

2 EQUIPMENT COVERED BY THE VOLUNTARY AGREEMENT 4

3 OVERALL OBJECTIVE 4

4 COMMITMENTS..... 4

5 REPORTING, MONITORING, REVISION & COMPLIANCE 6

6 NATURE AND ORGANISATION OF VOLUNTARY AGREEMENT 9

7 TERMINATION OF THE VOLUNTARY AGREEMENT 9

ANNEX B – CSTB Functionality and Operational Modes..... 11

ANNEX C – Calculation Of Total Energy Consumption 14

ANNEX D – Maximum Energy Consumption Targets and Time Schedule..... 17

Annex E - Test Procedure 17

ANNEX F – General Definitions 23

ANNEX G – Reporting Pro-Forma 25

ANNEX H – Signing Form 26

DRAFT

Document History

Version	Comments	Change type ¹	Date
3.0	Final version, including Tier 2		02/09/2011
	Deleted A9 (Annex A)	E	25/05/2012
	Added reporting dates	E	12/02/2013
	Modified Introduction to mention CoC	E	12/02/2013
	Revised test procedures to take account of tier 2	E	9/05/2013
	Formatting tidy up	E	09/05/2013
	Modified footnotes concerning grace period for reporting and new test procedure	E	15/05/2013
	Footnotes updated as per comments	E	17/05/2013
	Clarifications made to test procedure	E	17/05/2013
	Corrected table references in A.6	E	28/05/2013
3.1	3.1 Published		18/06/2013
4.0	Added material for Tier 3	T	8/08/2013
4.0	Split Table 6, added numbers, Edits to Commitments	T,E,	20/02/2014
4.0	Tables tidied, editorial comments included	T, E	22/07/2014
4.0	Further modifications of tables as per signatory comments	T, E	24/09/14
4.0	Limits Table updated as per Pace proposal Added reference to IEEE 1680.6 Resource Efficiency Standard	T, E	14/04/15

1 INTRODUCTION

Equipment for the reception, decoding and interactive processing of digital broadcasting and related services have contributed and will continue to contribute substantially to the electricity consumption of households in European Union. This Voluntary Agreement aims at reducing the potential electrical load represented by this equipment and at ensuring that the electrical efficiency of equipment required to support digital TV and related services is maximised.

This Voluntary Agreement lays down energy consumption requirements for CSTBs. It is complemented by a Code of Conduct on Digital TV which should be endorsed by any Signatory to this Voluntary Agreement aspiring to the best possible outcomes in the area of energy consumption.

While continual improvements have reduced the environmental impact of CSTBs, the CSTB industry recognises that further improvements must be pursued. It is recognised that the energy consumption of CSTBs is influenced by the services offered, the number of features provided and by the components used.

This Voluntary Agreement constitutes a valid alternative to an implementing measure in the context of the Ecodesign Directive, which provides that priority should be given to alternative courses of action such as self-regulation by the industry.

The Signatories shall ensure that this Voluntary Agreement is implemented in full compliance with all the provisions of the Treaty on the Functioning of the European Union (in particular internal market

¹ E = Editorial, No change to the meaning of the document, grammar/spelling and changes to wording to improve clarity. P = Process, changes which may be substantive but which do not affect the energy numbers. T = Technical, Any changes which affect the energy numbers

and competition rules) as well as with the international engagements of the EU, including multilateral trade rules, and accept that it shall be assessed against the indicative criteria set out in Annex VIII of the Ecodesign Directive and in the light of the European Commission Guide to the Implementation of Directives based on the New Approach and the Global Approach (“Blue Guide”).

2 EQUIPMENT COVERED BY THE VOLUNTARY AGREEMENT

This Voluntary Agreement is effective from the 1st July 2010 (the "Effective Date") and covers CSTBs, as described and defined in Annex B and Annex F. This Voluntary Agreement does not have retroactive effect: only individual CSTBs that are placed on the Internal Market for the first time on or after the Effective Date or which are put into service on the market for the first time on or after the Effective Date, in accordance with the Blue Guide, are subject to this Voluntary Agreement. The scope of the Voluntary Agreement as described in this Section 2 also applies to CSTBs that are manufactured outside the EU on or after the Effective Date and which are placed on the market within the EU.

3 OVERALL OBJECTIVE

The overall objective of the Voluntary Agreement is to reduce the energy consumption of CSTBs in accordance with the energy consumption targets and time frame established in Annex D (*Maximum Energy Consumption Targets and Time Schedule*), with a view to maximising the environmental benefits from improved design. Ecodesign requirements and energy consumption targets should be set bearing in mind the intended use of CSTBs, and should not have a negative impact on their functionality. In particular a detrimental impact on CSTBs (which would include slower start-up times, the ability to schedule recordings, the ability to record remotely, hinder the availability of push VOD content to customers, etc.) would seriously impede the intended use of the vast majority of CSTBs, and in so doing, would fundamentally undermine the EU Action Plan on Energy Efficiency for this product group.

In direct contrast to this, the Voluntary Agreement delivers an industry-wide commitment to reducing the potential environmental impact of CSTBs. It goes beyond a “business as usual” scenario and provides for quick progress by means of rapid and cost-effective implementation, while allowing for flexible and appropriate adaptation to technological options and market sensitivities. This Voluntary Agreement sets out the means by which the Signatories, which are drawn from across the spectrum of the CSTB industry, will commit to achieving such rapid and effective implementation while continuing to invest in and develop sustainable and appropriate “best of class” CSTB products.

4 COMMITMENTS

From the Effective Date or Signature Date, Signatories individually and collectively agree to be responsible to the European Commission and will each make their reasonable efforts to:

- 4.1 Abide by the general principles of CSTB hardware and software design set out in Annex A (*General Principles of CSTB Design*);
- 4.2 Reduce the energy consumption of CSTBs to the minimum necessary to meet their operational specification while not limiting Service Providers’ ongoing ability to improve functionality and offer service enhancements;
- 4.3 Not exceed the maximum energy consumption targets set out in Annex D (*Maximum Energy Consumption Targets and Time Schedule*). In particular:
 - 4.3.1 Each Signatory² shall ensure that its CSTBs comply with the applicable energy consumption targets of the Voluntary Agreement as set out in Annex D (*Maximum Energy Consumption Targets and Time Schedule*).;³
 - 4.3.2 Should a Signatory achieve compliance with Section 4.3.1 above, then that Signatory is entitled to make that achievement public;

² If they are an Equipment Manufacturer or Service Provider

³ See also paragraph 4.12

- 4.3.3 Should 25% or more of a Signatory's CSTBs comply with any subsequent energy consumption targets of the Voluntary Agreement as set out in Annex D (*Maximum Energy Consumption Targets and Time Schedule*) before the entry into force of those targets then that Signatory is entitled to make that achievement public.
- 4.3.4 In the event that any Signatory does (or did before it became a Signatory) acquire any company not being a signatory which places CSTBs on the market in the EU then any CSTBs placed on the market by that acquired company need not (although they may) be included for the purposes of calculating compliance with section 4.3.1 above for a period of three years after their acquisition.
- 4.4 Develop an appropriate commitment to ensure the active involvement of potential signatories;
- 4.5 Work with the European Commission, Member States' representatives and other interested parties involved in CSTBs to agree common working agendas to improve the environmental performance of CSTBs;
- 4.6 Co-operate with the European Commission and Member States to monitor the effectiveness of this Voluntary Agreement through the procedure described in Section 5 (*Reporting, Monitoring and Compliance*);
- 4.7 Co-operate with other Signatories, with the European Commission and with Member States to review the Voluntary Agreement and the Tier 2 and Tier 3 energy consumption targets through the procedure described in Section 7 (*Review, Revision and Termination of the Voluntary Agreement*);
- 4.8 Inform consumers about the environmental characteristics and performance of CSTBs, and facilitate and encourage consumers to adopt energy efficient practices in connection with the use of CSTBs. In particular, Signatories shall provide consumers with detailed information about energy consumption levels. Such information shall be made available at the point of sale or where relevant and possible, it may be published online. Note that this clause is applicable to the signatory in charge of the distribution of equipment to the end user
- 4.9 Ensure that procurement specifications for CSTBs are compliant with this Voluntary Agreement;
- 4.10 Signatories commit only to the areas which are under their individual control and responsibility.

Specifically Signatories who are:

- a) Component Manufacturers, in order to support Equipment Manufacturers in meeting and where possible improving upon the energy consumption targets contained within this Voluntary Agreement, commit to designing CSTB components which improve functionality and enable component sub-systems to be controlled and operated in the most energy efficient manner;
- b) Conditional Access Providers commit, in order to support Service Providers in meeting and where possible improving upon the energy consumption targets contained within this Voluntary Agreement, to designing and developing conditional access systems which enable improved CSTB energy efficiency without negatively impacting functional and operational requirements of Service Providers;
- c) Equipment Manufacturers commit to designing and manufacturing CSTBs to Service Providers functional and operational specifications that meet the commitments contained within this Voluntary Agreement and where possible improve upon them;
- d) Service Providers commit to working with all other Signatories in order that the Service Provider's supply of CSTBs to end-users is compliant with this Voluntary Agreement; and
- e) Software Providers, in order to support Service Providers in meeting and where possible improving upon the energy consumption targets contained within this Voluntary Agreement, commit to developing and supplying software power

management applications which enable Service Providers to fully utilise and integrate hardware power management features provided by Equipment Manufacturers and to do so without negatively impacting other CSTB features and functionality.

- 4.11 Resource Efficiency – Recognising that Ecodesign implies wider concerns than energy efficiency, and that within this document it will not be possible to fully explore other resource efficiency matters, the Signatories to this Voluntary Agreement commit to contribute to the IEEE 1680.6 Working Group.

This standard for complex set top boxes will be part of the IEEE 1680 family of standards that provide a clear and consistent set of performance criteria for the design of electronic products, and provide an opportunity to secure market recognition for efforts to reduce the environmental impact of electronic products. The environmental performance criteria of this standard are intended to define a measure of environmental leadership in: the design and manufacture of complex set top boxes; the delivery of specified services that are associated with the placing on the market of the product; and associated corporate performance characteristics. This standard is being defined with the intention that the criteria are technically feasible to achieve, but that only products demonstrating the leading environmental performance currently available in the marketplace would meet them at the time of their adoption. As the environmental performance of products that are available in the marketplace improves, it is intended that the criteria will be updated and revised to set a higher performance standard for leadership products. This standard will define environmental performance criteria for complex set top boxes including reduction or elimination of environmentally sensitive materials, materials selection, design for end of life, lifecycle extension, end of life management, corporate performance, and packaging.

- 4.12 It is recognised that 100% compliance with these commitments is desirable, however this Voluntary Agreement recognises that in certain circumstances, through design delays, excessive costs of small scale deployments etc., that there will be occasions where non-compliant product is placed on the market for a period of time. Thus an allowance of 10%⁴ will be made for such product. The non-compliance should be reported to the Independent Inspector and a target date for when these products will no longer be placed on the market should be made known. This information should be made known anonymously in the Independent Inspector's report. For the avoidance of doubt, only CSTBs placed on the market during the current Reporting Period shall count towards this target of 90%. This principle also applies to CSTBs that are manufactured outside of the EU, but which are supplied, distributed or used within the EU.

5 REPORTING, MONITORING, REVISION & COMPLIANCE

The European Commission in partnership with the Steering Committee shall be invited to monitor the achievements of the objectives set out in the Voluntary Agreement. The plan for monitoring and reporting shall be detailed, transparent and objective. It shall remain for the European Commission assisted by the Steering Committee to consider whether the objectives of the Voluntary Agreement have been met.

5.1 Reporting

Each Signatory shall provide information to the Independent Inspector detailing the energy consumption of each type of CSTB it places on the market in the EU in compliance with this Voluntary Agreement, as applicable, and taking into account the relevant provisions of Annex C (*Calculation of Total Energy Consumption*). For the avoidance of doubt, such reporting also applies to CSTBs manufactured outside of the EU, but placed on the market in the EU, in compliance with this Voluntary Agreement.

⁴ of total units placed on the market by a manufacturer or service provider in the EU

Each Signatory shall provide the required information for the relevant Reporting Period (see table specifying Reporting Periods below) in the format specified in the reporting template as published at cstb.eu website. Information supplied by a Signatory will be determined by its Main Activity (as categorised in Annex G). Each Signatory may not perform more than one Main Activity under this Voluntary Agreement.

	Tier 2	Tier 3
1st Reporting Period	1 st July 2013 – 30 th June 2014	1 st July 2016 – 30 th June 2017
2 nd Reporting Period	1 st July 2014 – 30 th June 2015	1 st July 2017 – 30 th June 2018
3 rd Reporting Period	1 st July 2015 – 30 th June 2016	1 st July 2018 – 30 th June 2019

Table 1: Reporting Periods for Tiers 2 and 3

For the given year the draft report should be submitted to the Independent Inspector by 31st August.

For the given year, the final Independent Inspector's report should be delivered by 31st October.

Where a Signature Date is not the start of a Reporting Period then a Signatory may choose one of the following:

1. For its first Reporting Period to run in line with the current Reporting Period and so to backdate its commitment
2. For its first Reporting Period to run from the date of signature until the end of that Reporting Period and so be shortened in the first year
3. For its first Reporting Period to commence at the start of the next Reporting Period and so to postdate its commitment

The Signatories note that some elements of reporting compliance under this Voluntary Agreement are likely to require the provision of commercially sensitive information. Requirements relating to the supply of information by the Signatory shall be proportionate and shall take into account the legitimate confidentiality of commercially sensitive information. These requirements shall provide for the secure supply and provision of all information (including commercially sensitive information). The receipt of information supplied by a Signatory shall always be subject to obligations of confidentiality. This will include maintaining confidentiality of information from other Signatories, while ensuring confidence in the compliance of individual Signatories with this Voluntary Agreement.

5.2 Monitoring

The Commission, in partnership with the Signatories shall be invited to monitor the achievement of the objectives of the Voluntary Agreement, in accordance with Annex VIII of the Ecodesign Directive. The Independent Inspector (who, for the avoidance of doubt, shall be bound by the same obligations of confidence as set out in Section 5.1) may be instructed to conduct an audit of the information supplied by any individual Signatory. The Commission, assisted by the Steering Committee, shall consider whether the objectives of the Voluntary Agreement have been met, taking into account the results of audits produced by the Independent Inspector. To preserve business secrets and commercial confidences, any official report produced by the Commission in connection with the information supplied by any individual Signatory shall not refer to the performance of individual companies.

The Chair of the Steering Committee will ensure that at least twice during each Reporting Period the Signatories and the Commission shall meet to discuss the Voluntary Agreement in order to:

- Evaluate the effectiveness of this Voluntary Agreement in achieving its objectives as set out in Section 3;
- Evaluate current and future developments that may influence energy consumption (for example, integrated circuit development, conditional access systems) with a view to agreeing a course of action and/or revising the Voluntary Agreement;
- Set future targets to increase energy savings.

Such discussions shall take place on a confidential basis.

5.3 Revision

5.3.1 Decisions to amend the Voluntary Agreement

Once the monitoring process set out in Section 5.2 of the Voluntary Agreement has been completed, the Steering Committee may agree to implement any necessary amendments to the Voluntary Agreement. All reasonable efforts shall be taken to ensure that the decisions of the Steering Committee to amend the Voluntary Agreement are taken on the basis of a consensus.

However, where consensus on an amendment to the Voluntary Agreement cannot be achieved in the course of a meeting of the Steering Committee, a call for an indicative vote may be made by the Steering Committee Chair or by a Quorum.

If the indicative vote indicates a favourable outcome (which shall be determined by achieving a minimum of a two-thirds majority) but a consensus is nonetheless not achieved, a call for a deciding vote may be made by a Quorum to be held at the following meeting of the Steering Committee. At such a second meeting, the adoption of a decision shall require:

- a. a Quorum (as defined in Annex F);
- b. compliance with the Voting Procedures;
- c. the agreement of a two thirds majority (66%) of the Quorum; and
- d. appropriate agreement from the European Commission. The Signatories will work together with the European Commission to agree how it will be involved in this process and shall amend the Voluntary Agreement accordingly.

Representatives from Member States and interested parties involved with CSTBs shall be invited to participate in discussions concerning amendments to the Voluntary Agreement, but shall not be entitled to vote on any proposed revision.

5.3.2 Any other decisions

All reasonable efforts shall be taken to ensure that the decisions of the Steering Committee are taken on the basis of a consensus.

However, where consensus on an issue cannot be achieved in the course of a meeting of the Steering Committee, a call for an indicative vote may be made by the Steering Committee Chair or by a Quorum.

If the indicative vote indicates a favourable outcome (in accordance with a requirement for a two-thirds majority) but a consensus is nonetheless not achieved, a call for a deciding vote may be made by a Quorum to be held at the following meeting of the Steering Committee. At such second meeting, the adoption of a decision shall be made in accordance with the Voting Procedures. At such a second meeting, the adoption of a decision shall require:

- a. a Quorum (as defined in Annex F);
- b. compliance with the Voting Procedures;
- c. the agreement of at least a two thirds majority (66%) of the Quorum.

5.4 Compliance

Compliance with the Voluntary Agreement by individual Signatories, including with the commitments set out in Section 4, shall be assessed by the Independent Inspector at the end of each Reporting Period on the basis of the information provided by each Signatory in accordance with Section 5.1, above.

A Defaulting Signatory shall forfeit its Signatory status. A mechanism shall be developed to remove the Signatory status of a Defaulting Signatory. The Signatories will work together to agree this mechanism and amend the Voluntary Agreement. A Defaulting Signatory may however, engage in discussions with the European Commission, Member States and other Signatories with the intention of meeting its commitments under this Voluntary Agreement.

In addition, it may be appropriate for a mechanism to be developed to allow a Defaulting Signatory, who is striving to meet the Voluntary Agreement and expects to do so within a short period, to continue as a Signatory. The Signatories will work together with other stakeholders to agree if this is appropriate and, if so, to develop a mechanism for assessing and reporting such cases and amend

the Voluntary Agreement, taking into account the requirement of equal treatment described in Section 6.1 below.

6 NATURE AND ORGANISATION OF VOLUNTARY AGREEMENT

6.1 Nature of Voluntary Agreement

The Signatory signs and enters into this Voluntary Agreement for and on behalf of itself and makes its commitment under the Voluntary Agreement to the Legal Entity (Technology Sectoral Governance INPO).

This Voluntary Agreement shall not amount to a commercial agreement and shall not give rise to any commercial expectations or liabilities as between the Signatories in respect of the fulfilment of their individual commitments under the Voluntary Agreement.

All Signatories will be treated equally and there shall be no special arrangements for individual Signatories.

6.2 Organisation of Voluntary Agreement

Each Signatory to the Voluntary Agreement as well as the European Commission shall have the right to nominate one person to represent it at the Steering Committee.

The Steering Committee shall elect, from amongst its members, a Chair. The Chair shall be responsible for convening the Steering Committee at regular intervals (and at least twice every Reporting Period) and for running such meetings of the Steering Committee. The Chair shall, however, have no executive or representative function unless this is delegated to them by the Steering Committee.

Meetings of the Steering Committee shall be open to named members and any person representing a Signatory or potential signatory to the Voluntary Agreement, as well as to any representatives of the European Commission or Member States, as well as member states of the EEA or EFTA, and any other person who wishes to attend and who the Steering Committee believes represents a legitimate stakeholder. The Steering Committee will seek to achieve agreement by consensus at all times. If consensus cannot be achieved, the Steering Committee may reach a decision in accordance with the Voting Procedures.

The Steering Committee may decide to develop and adopt further rules of procedure where it deems it necessary and may decide to delegate powers where it deems it to be necessary to specific individuals or to sub-committees.

7 TERMINATION OF THE VOLUNTARY AGREEMENT

Signatories remain bound by the Voluntary Agreement until they elect to terminate their Signatory status. A Signatory shall be entitled to terminate its Signatory status by giving twenty eight days' written notice to the Chair of the Steering Committee. The Chair shall inform all members of the Steering Committee, the European Commission and such other persons as the Chair may deem appropriate.

ANNEX A – General Principles of CSTB Design

A Signatory of this Voluntary Agreement agrees to use its reasonable efforts to ensure:

- A.1 CSTB's are designed so as to improve energy efficiency within the constraints of their operational specification;
- A.2 Operational and control systems are specified on the presumption that hardware has energy management built in, i.e. depending on the functionality required from the unit, the hardware could switch to a mode with a lower energy consumption;
- A.3 An Auto Power Down (APD) feature shall be provided and this shall be defaulted to "on" or "enabled".
- A.4 The APD feature requires that the CSTB automatically switches itself into the lowest standby mode which the Service Provider deems to be appropriate, after a period of time in the On mode following the last user interaction. This period of time shall be set at a default of no more than 4 hours by the Equipment Manufacturer or Service Provider and may be user adjustable but shall not be able to be set to a period of more than 8 hours. The CSTB should allow the viewer to continue watching beyond the set period by prompting the viewer to confirm that the CSTB is still in use. The APD feature may however be able to be overridden by a user through a menu option.
- A.5 The CSTB may exit a standby mode in order to download content and scan for program and system information, scheduling information, or any other maintenance activity. After activity is complete, the CSTB must return to a standby mode within no more than 15 minutes.
- A.6 Whilst adhering to the general principle of designing products to improve energy efficiency, Service Providers, Equipment Manufacturers, Software Providers, Conditional Access Providers and Component Manufacturers are constantly innovating their products as new service concepts and technologies develop. To avoid stifling such innovation, any unanticipated additional functionality which consumes significant energy but which is not listed in Table 5 or Table 6 in Annex D (Additional Functionalities Annual Energy Limit) shall be deactivated during the measurement process. However, in the event that such deactivation is either inappropriate or unnecessary, then this requirement shall not be compulsory. The test results shall explicitly list any functions that were deactivated during the measurement process. Signatories shall ensure that, when the Voluntary Agreement is revised in accordance with Section 5.3, the list of additional functionalities in Table 4 in Annex D is updated to take into account the incremental energy consumption of any additional functionality not known or implemented at the time the Voluntary Agreement first entered into force or was last revised.
- A.7 Software Downloads to CSTB's shall not increase the power consumption requirements above the initial TEC limit unless they provide additional functionality. Such additional functionality shall not increase the TEC limit if listed in Table 4 Annex D, otherwise it should be deactivated for measurement purposes as described in Section A.6.
- A.8 Direct to retail devices, that is, CSTBs not supplied to an end user via a Service Provider (as defined in Annex F of this Voluntary Agreement), that provide for speculative recording (typically push video-on-demand content) must have a user-accessible menu option allowing the user to disable this feature at will. Manufacturers must also include instructions for disabling speculative recording in product materials. CSTBs supplied by a Service Provider that provide for speculative recording must have a user-accessible menu option allowing the user to disable this feature at will, or alternatively a disable function that can be applied upon user request, for example via the Service Provider call centre. The Service Provider must also include instructions for disabling speculative recording in product materials.

ANNEX B – CSTB FUNCTIONALITY AND OPERATIONAL MODES

B.1 CSTB

A CSTB is a device equipped to allow conditional access by descrambling using dynamically allocated keys, where the primary function of the device is the reception, descrambling and processing of data from digital broadcasting streams and related services. It may also have audio and video decoding and output capability and/or the ability to provide content to one or more dedicated Thin-Client/Remote CSTBs via a home network, and/or gateway and routing functions.

For the purposes of the Voluntary Agreement a device shall not be considered to be a CSTB unless it can fulfil the functions of a CSTB when activated by the operator of the network.

A Simple STB, as defined in Annex F, is outside the scope of this Voluntary Agreement. For avoidance of doubt, the use of fixed key descrambling or the inclusion of an HDMI interface and/or Huffman coding does not make a STB that would otherwise be classified as a Simple STB into a Complex STB. Also excluded from the scope of this Voluntary Agreement are devices whose primary function is something other than the reception of television signals, such as, but not limited to:

- Computers fitted with digital TV tuners or TV add-in cards;
- Games consoles with digital TV tuners
- Digital receivers with recording function based on removable media in a standard library format (VHS tape, DVD, Blu-ray disc and similar)
- Digital TVs with integrated receiver decoder
- External plug in digital receivers for computers (e.g. USB)

B.2 TEC Base Functionality Limits of CSTBs

The TEC base functionality limits of all CSTBs includes conditional access to allow the descrambling of standard definition digital video and audio signals. The base functionality of all CSTBs includes the reception of digital TV signals from Cable, Satellite, IP or Terrestrial distribution systems, or else Thin-Client functionality, as further specified below.

The classification of each CSTB (as set out below) is distinct and each classification is mutually exclusive. In the event that a particular CSTB might fall into more than one of the categories below then it shall be treated as falling solely into the first such category.

- Cable CSTB is a CSTB which is capable of receiving digital television signals from a coaxial or hybrid fibre/coaxial distribution system and delivering them to a consumer display and/or external rendering/recording device. If the CSTB meets the definition of a Cable CSTB and the CSTB is capable of receiving a cable service protected by conditional access, the base functionality is defined to be cable, regardless of whether the cable reception is considered the “principal functionality” by the Manufacturer or Service Provider.
- Satellite CSTB is a CSTB which is capable of receiving digital television signals from a satellite transmission system and delivering them to a consumer display and/or external rendering/recording device. If the CSTB base functionality is not cable and the CSTB meets the definition of a Satellite CSTB and the CSTB is capable of receiving a satellite service protected by conditional access, the base functionality is defined to be satellite, regardless of whether the satellite reception is considered the “principal functionality” by the Manufacturer or Service Provider.
- Internet Protocol (IP) CSTB is a CSTB which is capable of receiving digital television/video signals encapsulated in IP packets and delivering them to a consumer display and/or external rendering/recording device. If the CSTB base functionality is not cable or satellite and the CSTB meets the definition of an IP CSTB and the CSTB is capable of receiving an IP service protected by conditional access, the base functionality is defined to be IP, regardless of whether the IP reception is considered the “principal functionality” by the Manufacturer or Service Provider.
- Terrestrial CSTB is a CSTB which is capable of receiving digital television signals from a terrestrial transmission system and delivering them to a consumer display and/or external rendering/recording device. If the CSTB base functionality is not cable, satellite or IP and the

CSTB meets the definition of a Terrestrial CSTB and the CSTB is capable of receiving a terrestrial service protected by conditional access, the base functionality is defined to be terrestrial, regardless of whether the terrestrial reception is considered the “principal functionality” by the Manufacturer or Service Provider.

- E. Thin-Client/Remote CSTB: A CSTB that is designed to interface between a CSTB and a TV (or other output device) that has no ability to interface with the Service Provider directly and relies solely on a Cable, Satellite, IP or Terrestrial CSTB for content. Any CSTB that meets the definition of Cable, Satellite, IP or Terrestrial CSTB is not a Thin-Client/Remote CSTB. If the CSTB base functionality is not cable, satellite, terrestrial or IP, and the CSTB otherwise meets the definition of Thin-Client/Remote, the base functionality is defined to be thin-client/remote.

B.3 Additional TEC Functionality Limits of CSTBs

- A. Access to Additional RF Channels: Access to additional RF channels may be achieved either by adding additional RF narrowband tuners (each with its corresponding demod) or else by providing a wideband (or full band capture) tuner capable of accessing multiple channels simultaneously (via multiple demods) either from the primary network or else from a physically separate network. For example, the CSTB may allow access to multiple RF channels and have the ability to tune and demodulate two or more separate streams of video, audio, interactive media, service information or EPG data simultaneously and process these stream separately. This limit does not apply to additional network-based IP inputs such as an additional Ethernet interface. The limit given is per additional RF channel; please note that this limit refers to the capability of accessing additional frequencies simultaneously (via multiple demods) and without restriction
- B. Advanced Video Processing: Advanced methods for video decoding, giving compression efficiency significantly beyond MPEG-2. Examples include, but are not limited to, H.264/AVC and SMPTE 421M.
- C. High Efficiency Video Processing: High Efficiency methods for video decoding, giving compression efficiency significantly beyond H.264/AVC. This includes, but is not limited to, the example of HEVC.
- D. High Definition (“HD”) Resolution: Video output with resolutions greater or equal to 720p (1280 pixels x 720 lines at 50 frames/s progressive) or 1080i (1920 pixels x 1080 lines at 25 frames/s interlaced).
- E. Full High Definition Resolution: Video output with resolutions greater or equal to 1080p (1920 pixels x 1080 lines at 50 frames/s progressive). This relates to chipsets which are capable of decoding and displaying such resolutions.
- F. Ultra High Definition Resolution: Video output with resolutions greater or equal to 4Kx2K (3840 pixels x 2160 lines at 50 frames/s progressive).
- G. 3DTV Processing: Producing a 3D output by using a method that requires the processing of some form of difference signal. This includes, but is not limited to, MPEG MVC. It excludes frame compatible representation of 3D.
- H. Advanced Graphics Processing: advanced graphics capabilities for providing 3D graphics acceleration giving support for OpenGL ES 2.0 or higher.
- I. Digital Video Recorder (DVR): A device that stores video in a digital format to a rewritable disk drive or other non-volatile storage media local to the unit. The term covers DVR functions integrated in a CSTB; it does not include server based DVR capabilities. DVR capability may also provide ‘live pause’ functionality. For the DVR energy limit to be claimed the recording capability must be greater than 30 minutes.
- J. Multi-decode: A CSTB with a functionality limit that meets the definition for Cable, Satellite, IP or Terrestrial CSTB above and is capable of decoding more than one content stream. Picture in Picture (PIP) is one example of Multi-decode functionality.
- K. Multi-display: A CSTB with a functionality limit that meets the definition for Cable, Satellite, IP or Terrestrial CSTB above and is capable of providing independent content streams to multiple end points external to the CSTB, e.g. TVs, within a single family dwelling.
- L. Multi-encoding: A Cable, Satellite, IP or Terrestrial CSTB that is also capable of audio-video encoding from the highest claimed decoding resolution of the device

- M. In home Networking including Access Point: The capability to interface with external devices over a high bandwidth network (e.g., IEEE 802.11 (WiFi), MoCA, HPNA, HomePlug). The limit is per network interface type implemented for home networks. For purposes of this Voluntary Agreement, IEEE 802.3 wired Ethernet is not considered to be an In-home Networking Interface..
- N. In-Home Networking Router: The capability to determine the optimal path along which IP traffic should be routed IP between different home networks (e.g. IEEE802.11g and IEEE802.11ac), based on layer information
- O. Return Path Functionality: This is an indicator of an enhanced functionality CSTB. Return Path functionality may be provided by any common means of connecting to a telecommunications network and used for the purpose of two-way data communications between the CSTB and the service provider (e.g. Ethernet, Wi-Fi, cable modem or telecommunications modem).
- P. Return Path Technical Interface: In addition to the Return Path Functionality limit, a further limit applies for CSTBs which include a broadband cable modem or broadband telecommunications modem. The value of this limit is dependent on the broadband technology used (see table in Annex D, section D.3). No Technical Interface limit applies to the lower power consuming return path technologies (e.g. Ethernet or PSTN), which are assumed to be covered by the Return Path Functionality Limit.
- Q. Speculative Recording: Automated recording based on customer profiling.
- R. Telephony the ability to connect to home telephone systems including but not limited to VOIP (Voice Over IP), DECT (Digital Enhanced Cordless Telecommunications), POTS (plain old telephone system)
- S. Smart Home services / Ultra high processing capability: High-end services requiring ultra-high-end CPU and memory concept providing:
 - high (DMIPS) processing capability
 - capability to run securely and independently concurrent applications
 This is a non-exhaustive list of possible “Smart Home” services:
 - Support to “Smart Grids” concept
 - Home security, monitoring and automation
 - E-Health
 - Connected Home usage learning and users profiling....

B.4 Operational modes

- A. **On**: Operational mode in which the CSTB is at least actively performing its base functionality. Note that the power consumption targets related to “On” mode might be variable over the time and dependent on the real functionality requested from the CSTB.
- B. **Standby**: Operational mode in which the CSTB has less energy consumption, capability, and responsiveness than in the “On” mode. The power consumption targets related to “Standby” mode might be variable and dependent on the real functionality requested from the CSTB.
- C. The CSTB may enter a Standby mode from the On mode after:
 - a. the CSTB receives a notification from the user to enter a standby mode via a power button press on a remote control or front panel of the unit, or through an electronic signal or data packet received via a digital interface on the CSTB; or
 - b. the CSTB auto-powers down to a standby mode. The power consumption after auto-power down to standby and after a user initiated power down to standby may or may not be equivalent.

ANNEX C – CALCULATION OF TOTAL ENERGY CONSUMPTION

The energy consumption shall be calculated and declared taking into account the relevant provisions of this Annex. In this measurement process, the energy consumed in the On and standby modes will be multiplied by the number of hours a defined typical device spends in On and Standby. The result will be a single energy value representing the energy usage of the device over the course of an entire year: its Total Energy Consumption (TEC).

The *Total Energy Consumption* of a CSTB is compared to its *Total Energy Limit* to determine its compliance with this Voluntary Agreement. The following parts describe the way for determining CSTB yearly energy limits as well as calculating their Total Energy Consumption.

C.1 General

The CSTB should be tested as shipped and as normally installed for the end-user. Where the same CSTB has been shipped with more than one software version during the course of a reporting period, then a single representative unit may be tested. Where the CSTB is capable of supporting a wired or wireless local area network this should be disabled unless a limit is available in respect of this network in accordance with Annex D. If it cannot be disabled, the CSTB should be operated in the most basic mode required to produce picture and sound from the specified broadcast stream, for one local monitoring point working to the standard of that broadcast stream.

One appropriate digital (test) HD broadcast stream shall be fed into the equipment. If the equipment does not accept HD inputs a standard (SD) stream shall be used.

No peripherals shall be attached except when necessary for feeding the broadcast stream into the equipment and delivering the function(s) as described in this Annex. Where such a peripheral requires power from the CSTB (e.g. a powered antenna for a Terrestrial CSTB or a Low Noise Block (LNB) for a Satellite CSTB), is not of a unique design specific to the CSTB but it is essential to make the CSTB function, then the energy required for the peripheral shall not be included in the test measurement.

C.2 Calculated Total Energy Consumption criteria

The criterion used in order to assess compliance of CSTBs with this Voluntary Agreement is its calculated total energy consumption (TEC – in annual kWh). The criterion is a limit for base functionality, plus limits for specific, additional functionalities present across a duty cycle. This duty cycle is further explained in Sub-Section C.7.1.

C.3 Base Functionality Limit

The appropriate base functionalities are defined in Annex B.2. The corresponding limits values are given in the Table 3 of Annex D (*Maximum Energy Consumption Targets and Time Schedule*).

C.4 Additional Functionality Limit

The appropriate additional functionalities are defined in Annex B.3. If applicable, these shall be determined using values from Table 4 of Annex D.

C.5 Calculating Annual Energy Limit

To calculate the Voluntary Agreement limit for a given CSTB, take the sum of the base functionality limit and all applicable additional functionalities limits (note that there may not be any additional functionality in devices such as standard cable or satellite CSTBs). This sum is the calculated annual kWh limit, or Total Energy Consumption (TEC) value. This sum equals the maximum amount of energy the box can use in a given year as calculated following the measurement procedure described in this Annex E.

Annual Energy Limit = Base Functionality Limit + Additional Functionalities Limit

C.6 Multi-decode and Multi-display Functionality Limits

Additional limits are applicable to products providing one or both of the following functionalities:

- **Multi-decode:** providing two or more different decoded videos. This functionality is commonly implemented in a single display as Picture in Picture (PIP).
- **Multi-display:** providing independent content to more than one display or thin client. When claiming the limit for a second display, the content provided to the second display must be different to the content provided to the primary display.

Specific requirements for testing CSTBs with Multi-decode and/or Multi-display are described below.

a. Multi-decode

When using the Multi-decode additional functionality energy limit to establish the criteria for a CSTB, the following procedure shall be followed:

- First, test the CSTB operating with single-decode and compare the results to the energy limit assuming the CSTB will deliver one decoded video, i.e. do not include the Multi-decode limit. If the CSTB meets the target, no further measurement is required.
- If the CSTB does not pass the single decode device CSTB test, then determine if it qualifies by including the Multi-decode limit when it provides multi-decode functionality (e.g. with independent content on main picture and PIP using the same display):
 - Add the Multi-decode additional energy limit listed in Table 3 of Annex D to the limits established for the CSTB.
 - Compare the test results to the total limit to see if the CSTB is compliant with the Voluntary Agreement when providing multi-decode functionality.

b. Multi-display

When using the Multi-display additional functionality energy limit to establish the criteria for a CSTB, the following procedure shall be followed:

- First, test the CSTB operating with single-display and compare the results to the energy limit assuming the CSTB will deliver content to only one display device, i.e. do not include the Multi-display limit. If the CSTB meets the target, no further measurement is required.
- If the CSTB does not pass the single display device CSTB test, then determine if it qualifies by including the Multi-display limit when it provides multi-display functionality (e.g. providing different encoded video content to another display device, which performs the decoding):
 - Add the Multi-display additional energy limit listed in Table 3 of Annex D to the limits established for the CSTB.
 - Compare the test results to the total limit to see if the CSTB is compliant with the Voluntary Agreement when providing multi-display functionality.

c. Multi-decode and Multi-display

When using both the Multi-decode and Multi-display additional functionality energy limits to establish the criteria for a CSTB, the following procedure shall be followed:

- First, test the CSTB operating with single-decode and single-display and compare the results to the energy limit assuming the CSTB will deliver one decoded video to one display device, i.e. do not include either the Multi-decode or Multi-display limit. If the CSTB meets the target, no further measurement is required.
- Secondly, if the CSTB does not pass the single decode and display test and if appropriate for the CSTB implementation, determine if it qualifies by including the Multi-decode limit when it provides multi-decode functionality, as described in section a. above. If the CSTB meets the target, no further measurement is required.
- Thirdly, if the CSTB does not pass the multi-decode test and if appropriate for the CSTB implementation, determine if it qualifies by including the Multi-display limit when it provides multi-display functionality, as described in section b. above. If the CSTB meets the target, no further measurement is required.
- Finally, if the CSTB does not pass the multi-display test, determine if it qualifies by including both the Multi-decode and Multi-display limits when it provides both multi-decode and multi-display functionality (e.g. providing different decoded content to another display device):
 - Add the Multi-decode and Multi-display additional energy limits listed in Table 3 of Annex D to the limits established for the CSTB.
 - Compare the test results to the total limit to see if the CSTB is compliant with the Voluntary Agreement when providing both multi-decode and multi-display functionality.

C.7 Device Total Energy Consumption (TEC) Assessment

In this Voluntary Agreement, the power consumed in the On and Standby modes will be multiplied by the number of hours a defined typical device spends in On and Standby. The result will be a single energy value representing the energy usage of the device over the course of an entire year.

C.7.1 Duty cycle

The Base Duty Cycle defines the number of hours during which a CSTB is considered to be working in “On”(=> T_{On}) and “Standby modes” (=> $T_{Standby}$ or T_{APD}).

The duty cycle is dependent on the Auto Power Down feature.

CSTB <u>with</u> APD	On	Standby	Standby from APD
Daily time duration in this mode	$T_{On}= 4.5h$	$T_{Standby}=15h$	$T_{APD} =4.5h$

Table 2: **Base Duty Cycle**

C.7.2 TEC Assessment

Calculate the base energy consumption by multiplying the measured power consumption as specified in this test procedure by the hours per day values in the equation below. P_{On} , $P_{Standby}$ and P_{APD} are power levels in watts as measured according to the measurement procedure set out in this Annex E.

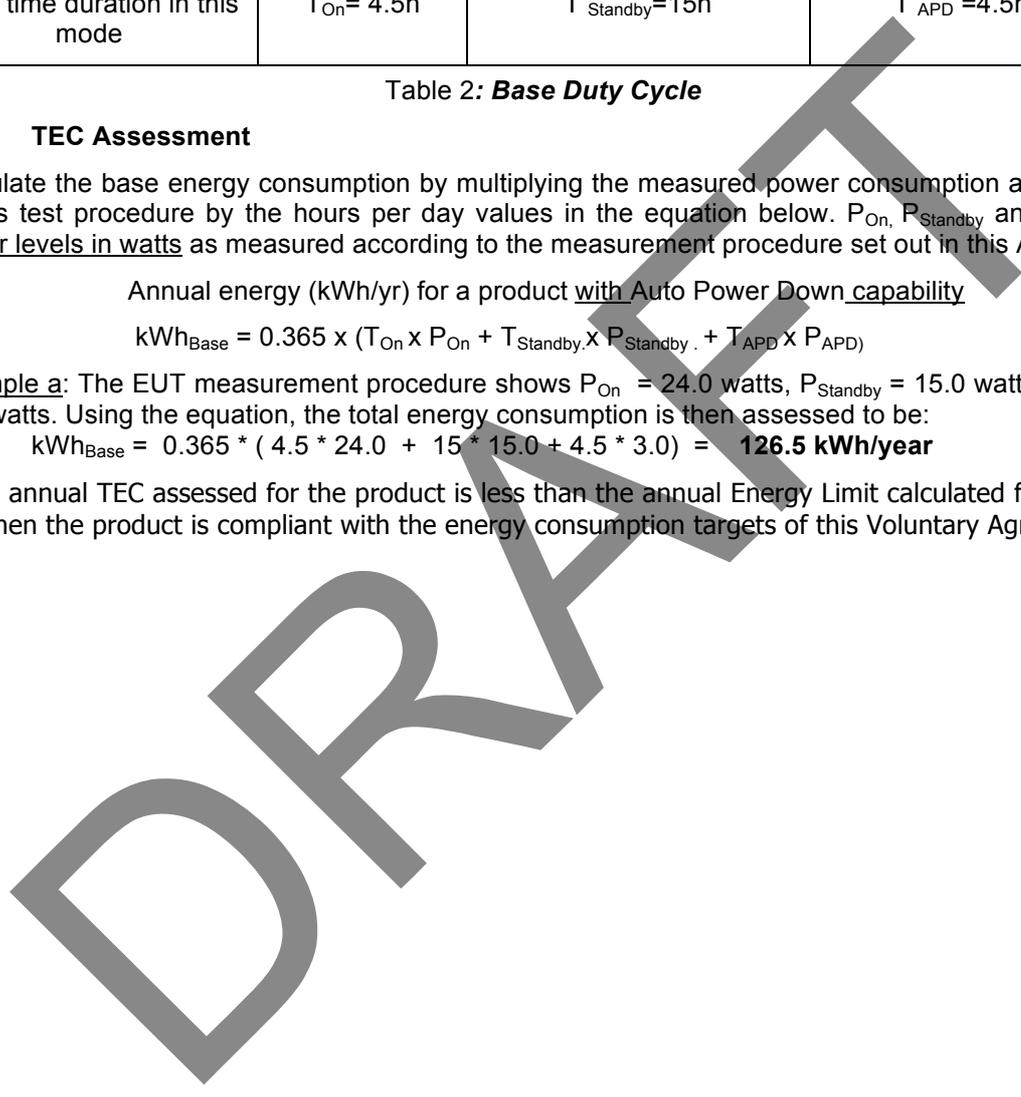
Annual energy (kWh/yr) for a product with Auto Power Down capability

$$kWh_{Base} = 0.365 \times (T_{On} \times P_{On} + T_{Standby} \times P_{Standby} + T_{APD} \times P_{APD})$$

Example a: The EUT measurement procedure shows $P_{On} = 24.0$ watts, $P_{Standby} = 15.0$ watts and $P_{APD} = 3$ watts. Using the equation, the total energy consumption is then assessed to be:

$$kWh_{Base} = 0.365 \times (4.5 \times 24.0 + 15 \times 15.0 + 4.5 \times 3.0) = \mathbf{126.5 \text{ kWh/year}}$$

If the annual TEC assessed for the product is less than the annual Energy Limit calculated from Annex ED, then the product is compliant with the energy consumption targets of this Voluntary Agreement.



ANNEX D – MAXIMUM ENERGY CONSUMPTION TARGETS AND TIME SCHEDULE

D.1 Effective Date: This Voluntary Agreement is effective from July 1, 2010.

Tier 2 energy consumption targets became effective on July 1, 2013.

Tier 3 energy consumption targets will become effective on July 1, 2016

D.2 Base Functionality and Additional Functionality Limits

The base functionality limit, if applicable, shall be determined using values from Table 3. See also Annex B.2.

	Tier 2 kWh/year	Tier 3 kWh/year	Notes
Base functionality			
Cable	40	55	
Satellite	40	55	
IP	35	40	
Terrestrial	35	40	
Thin-Client/Remote	35	50	
Additional functionality			
Advanced Video Processing	0	0	
High Efficiency Video Coding ⁵	20	15	Once per equipment
High Definition	0	0	
Full High Definition ⁶	20	20	Once per equipment
Ultra High Definition (DVB Phase 1) ⁷	30	25	Once per equipment
3DTV none stereoscopic broadcast	20	15	Once per equipment
Advanced Graphic Processing	5	5	Once per equipment
Additional AV Channels	15	10	Per channel, not IP inputs
Additional AV Channels – IP Only		5	
DVR ⁸	20	20	20

⁵ The limit only applies when decoded video is available in analog or digital form and /or when Equipment provides transcoding capability from content encoded with advanced video coder.

⁶ 1080p50 or above

⁷ Mutually exclusive with Full High Definition

⁸ For this to be claimed, the recording capability must be greater than 30 minutes

Return path functionality	25	0	Once per equipment, Rolled into base for Tier 3
Return path technology ADSL	30	20	Once per equipment
Return path technology DOCSIS 2.0		20	Once per equipment
Return path technology VDSL	50	30	Once per equipment
Return path technology DOCSIS 3.0 (first 4 ch)		30	Once per equipment
Return path technology DOCSIS 3.0 (add 4 ch)		20	Per 4 bonded channels
Multi-decode	25	0	
Multi-encoding ⁹	N/A	0	Per encoder
Multi-display ¹⁰	6	5	Once per equipment
Multi-Room		40	Minimum of 3 displays
In-home Network	12	15	Per interface
In-home Networking access point-router	N/A	20	Once per equipment
VOIP	N/A	15	Once per equipment
Ultra high proc. Capability (>5K DMIPS)	N/A	10	Once per equipment
Smart home services		TBD	
Additional Proposed Allowances			
MIMO WiFi: 2.4 GHz ¹¹	N/A	3	per spatial stream
MIMO WiFi: 5 GHz	N/A	10	per spatial stream

Table 3: **Base Functionality and Additional Functionality Limits**

⁹ This limit may only be used for Equipment that can provide independent content. e.g. to more than one display device such as TV, portable media player, or provide PIP.

¹⁰ This limit may only be used for Equipment that can provide independent content to more than one display device, e.g. TV, portable media player.

¹¹ Both MIMO limits are separate to “In Home Access Point - Router

ANNEX E - TEST PROCEDURE

E.1 Overview

All testing shall be carried out as specified below.

- A. This section defines a manufacturer independent test process to determine the power consumption of a CSTB under various standardised operating conditions, these are designed to emulate average 'real world' viewing habits. All testing shall be carried out in controlled repeatable conditions, as specified below. The general conditions of test are described in IEC 62301 (Household electrical appliances – Measurement of standby power). As far as timing is concerned, user initiated as well as APD Standby mode measurement should be taken no less than 30 minutes after the device enters such a mode. Except for a smart card or conditional access module there shall be no external loads connected to the EUT, unless these are required for the EUT to function. If other external loads are required these shall not measurably increase the load on the EUT e.g. for satellite the LNB supply shall be via a DC block (i.e. powered independently).
- B. All compliance testing shall be carried out on products representative of production units. To provide results that will give an accurate representation of actual deployed usage the software used in the EUT shall, where possible, be the same as the software used by the product when deployed by the service provider. Where the same CSTB has been shipped with more than one software version during the course a Reporting Period then a single representative unit may be tested.
- C. The compliance testing shall be carried out on one random sample product.. If the product fails then that model does not comply with this document. If the product passes with a margin of less than 10% then 2 further random samples shall be taken, if both of these pass then the product complies, if any one exceeds the limits then the product does not comply.
- D. Where the energy consumption can be influenced by the end user, then all measurements shall be made using the default (as shipped) settings.
- E. When testing, the audio/video content shall have a high bit rate, typically a sports or film channel
- F. Where the limit for Full High Definition, Ultra High Definition or 3DTV processing is claimed then the EUT shall decode and output at the highest resolution claimed
- G. Where a limit for the Return Path is claimed then the EUT must be operated to the highest version of the Return Path technology for which a limit is claimed.
- H. Where the limit for Advanced Video Processing or High Efficiency Video Processing is taken, then at least 1 test stream shall be encoded with that technology
- I. Where the limit for Advanced Graphics Processing is taken then one channel shall display an image utilising AGP
- J. Where the limit for Multi-Encode and Multi-Display are claimed then at least one additional display device shall be connected to the EUT when performing the test methods set out at Sections E4-E9 of this Annex E and the secondary display device shall render different content than the primary display device being used for the test. The EUT shall provide content to the additional display device for the duration of the test.
- K. Where a product is capable of scheduling a recording in any mode then for all tests a recording shall be scheduled for at least 2 hours after that test will be completed
- L. Where the limit for In home Networking including Access point is claimed, then the network interface shall be used to transfer audio and video to or from a single Client or Host, Wi-Fi shall be the default In Home networking interface, if Wi-fi is not available then MoCA shall be used if MoCA is not available then HPNA shall be used, if HPNA is not available then Home Plug shall be used,
- M. Where the limit for In Home Networking Access point Router is claimed, Router functionality shall be enabled, and a minimum of one link established, it is not necessary to transfer data over the link.
- N. Where the Telephony allowance is claimed the EUT shall have at least 1 telephone connected to each port type (DECT,VOIP, POTS). The phones shall be on-hook, and shall not make or receive calls for the duration of the tests.
- O. The results of the testing shall be documented, including the model tested, the serial number of the EUT and the software version numbers.

E.2 IEC 62301 Basic test requirements

The general conditions of test are described in IEC 62301 (Household electrical appliances - Measurement of standby power). The main requirements are summarised below.

Test Conditions	Value
Ambient temperature	23 ± 5 °C
Air speed close to the unit	≤ 0.5 m/s
Supply voltage	230V ± 1% 50 Hz ± 1%
Supply voltage waveform	Total harmonic content ≤ 2% Crest factor between 1.34 and 1.49
Power measurement accuracy:	
Power level ≥ 0.5W	Uncertainty ≤ 2% at the 95% confidence level
Power level ≤ 0.5W	Uncertainty ≤ 0.01 W at the 95% confidence level
Instrument resolution:	
Power ≤ 10 W	Resolution ≥ 0.01 W
Power 10 ≤ 100 W	Resolution ≥ 0.1 W

Table 7 - Main requirements of IEC62301

Test instruments shall be calibrated annually to traceable national standards to maintain the levels of accuracy above.

E.3 Test Method for Standby (P_{Standby} , user initiated)

- A. The EUT shall be put into its "On" mode.
- B. After 5 minutes in this mode, the standby or off button on the remote control shall be pressed.
- C. The EUT shall then be left for a maximum of 30 minutes for any housekeeping activities to complete.
- D. At the end of the 30 minutes or completion of housekeeping activities (whichever is shorter) the average energy shall be measured for a period of 5 minutes. Based on this 5 minute measurement the standby part of the TEC shall be calculated.
- E. If the EUT has an automatic standby cycle where automatic wake up from a low power mode is used periodically to receive updates then the test cycle duration shall be amended to 1 complete cycle (e.g. 30 minutes passive standby and 5 minutes active standby, test cycle 35 minutes total) the standby part of the TEC shall be calculated based on 1 complete cycle.
- F. If the EUT has a variable power usage of another type during standby, the average energy shall be measured (and calculated if appropriate) over the "Daily time duration in this mode" specified in table 1. Periods of active content download (e.g. nightly maintenance wake up) that may take place during this time shall not be considered. E.g. if the EUT has both light sleep and deep sleep, then the power shall be measured in both modes and the total standby consumption measured or calculated from the time in standby, until automatically switching to deep sleep and the remaining time in deep sleep.
- G. If the EUT is fitted with a front panel switch which initiates a different level of energy saving, then the test shall be repeated using the front panel switch to initiate the standby mode, with the test cycle as sections E3A-F. If the results are different then the higher value shall be used.
- H. If the EUT is fitted with a manual switch on a rear face then that switch shall be disregarded.
- I. Based on this measurement the User initiated Standby part of the TEC shall be calculated.

E.4 Test Method for Auto Power Down (P_{APD} , EUT initiated)

- A. The EUT shall be connected to, and displaying a Standard Definition stream
- B. The EUT shall be left until the auto power down takes place.
- C. The EUT shall then be left for a maximum of 30 minutes or for any housekeeping activities (whichever is shorter) to complete. At the end of the 30 minutes or housekeeping activities the average energy shall be measured in accordance with section E3 above. If the EUT has a variable power usage of another type during standby, the average energy shall be measured (and calculated if appropriate) over the "Daily time duration in this mode" specified in table 1. Periods of active content download (e.g. nightly maintenance wake up) that may take place during this time shall not be considered. E.g. if the EUT has both light sleep and deep sleep, then the power shall be measured in both modes and the total standby consumption measured or calculated from the time in standby, until automatically switching to deep sleep and the remaining time in deep sleep.
- D. Based on this measurement the APD part of the TEC shall be calculated.

E.5 Test method for "On" mode of Standard Definition non-DVR

- A. The EUT shall be connected to, and displaying a standard definition stream.
- B. The EUT shall then be left for a maximum of 30 minutes or until the EUT has stabilised.
- C. The average energy shall then be measured over a period of 5 minutes.
- D. Based on this 5 minute measurement the "On" mode part of the TEC shall be calculated.

E.6 Test method for "On" mode of HD, Full HD, UHD and 3D-TV non-DVR

- A. The EUT shall be connected to, and displaying a stream of the highest resolution for which a limit is claimed and 3DTV if applicable.
- B. The EUT shall then be left for a maximum of 30 minutes or until the EUT has stabilised.
- C. The average energy shall then be measured for a period of 5 minutes.
- D. The EUT shall then be re-tuned to a 2D high definition channel at the highest resolution for which a limit is claimed and the average consumption measured for a further 5 minutes.
- E. Based on these 2 measurements totalling 10 minutes, the "On" mode part of the TEC shall be calculated.

E.7 Test method for "On" mode of Standard Definition DVR

- A. The EUT shall be connected to a Standard Definition stream.
- B. The EUT shall then be left for a maximum of 30 minutes or until the EUT has stabilised.
- C. The EUT shall then be set to view 1 SD channel whilst a second channel is recorded.
- D. The average energy shall then be measured for a period of 5 minutes.
- E. For the purposes of this test where there is more than 1 tuner the viewed channel shall be different to the recorded channels.
- F. Based on this 5 minute measurement the "On" mode part of the TEC shall be calculated.

E.8 Test method for "On" mode of High Definition, Full High Definition, UHD and 3D-TV DVR

- A. The EUT shall be connected to, and displaying a stream of the highest resolution for which a limit is claimed.
- B. The EUT shall then be left for a maximum of 30 minutes or until the EUT has stabilised.
- C. The EUT shall then be set to view 1 channel at the highest resolution for which a limit is claimed, whilst a second HD channel is recorded at a minimum resolution of 720P. For products with more than 2 tuners the EUT shall be set to view 1 channel at the highest resolution and shall record 2 channels at a minimum resolution of 720P.
- D. For the purposes of this test where there is more than 1 tuner, each channel shall display or record different content.
- E. The average energy shall then be measured for a period of 5 minutes
- F. Based on this 5 minute measurement the "On" mode part of the TEC shall be calculated.

E9 Test method for "On" mode for In Home Networking including Access Points

- A. The EUT shall be connected to, and displaying a stream of the highest resolution for which a limit is claimed
- B. The EUT shall then be left for a maximum of 30 minutes or until the EUT has stabilised.
- C. A second channel shall be outputted to a display device or Client via an In Home Networking Interface, selected in the priority order specified in section E1 J. at a minimum resolution of 720P. For DVR products with more than 2 tuners, a 3rd channel at a minimum resolution of 720P shall be recorded. For products with more than 2 tuners and no DVR capability a 3rd channel shall also be outputted to a different display device or client.

DRAFT

ANNEX F – General Definitions

- F.1 “Auto-Power-Down” or “APD” means the capability to automatically switch from the On mode to a standby mode after a period of time without user input, generally based on the amount of time the unit has remained “idle” from last active use, i.e. user input such as channel change, volume change, menu access, etc.
- F.2 “Component Manufacturer” means a company or other legal entity that is responsible for designing and manufacturing components that will be used by a second company to build a product.
- F.3 “Conditional access” means the encryption, decryption and authorization techniques employed to make access to content conditional upon authorisation using a key that is dynamically allocated using a Conditional Access (CA) or Digital Rights Management (DRM) system.
- F.4 “Conditional Access Provider” means a company that supplies the encryption, decryption, and authorization techniques employed to protect content from unauthorized viewing.
- F.5 “CSTB” means a complex set top box, the functionality, components and operational modes and power modes of which is more particularly defined within Annex B and which is placed on the Internal Market for the first time on or after the Effective Date or put into service in the Internal Market for the first time on or after the Effective Date.
- F.6 “Data Over Cable Service Interface Specification” (DOCSIS/EuroDOCSIS) means a suite of standards that define interface requirements for cable modems involved in high-speed data and video/audio content distribution over cable television systems. Successive versions of the standard have been developed, including:
- DOCSIS/EuroDOCSIS 2.0: Second generation DOCSIS standard
 - DOCSIS/EuroDOCSIS 3.0: Third generation DOCSIS standard, which provides higher bit rates by use of channel bonding
- F.7 “Defaulting Signatory” means a Signatory that has failed to comply with its commitments under the Voluntary Agreement.
- F.8 “Digital Subscriber Line” (DSL) means a suite of standards that define interface requirements for modems involved in high-speed data and video/audio content distribution over telephone subscriber lines. The DSL family consists of several individual standards, including:
- ADSL: Asymmetric Digital Subscriber Line
 - ADSL2plus: Second generation ADSL with extended bandwidth
 - VDSL: Very High Speed Digital Subscriber
 - VDSL2: Very High Speed Digital Subscriber Line second generation
- F.9 “Effective Date” means the 1st of July 2010.
- F.10 “Equipment Manufacturer” means the company who uses a component or components made by the Component Manufacturer, and is responsible for designing, developing and/or manufacturing a CSTB with a view to placing it on the Internal Market on its own behalf.
- F.11 “Equipment Under Test” or “EUT” means the equipment being tested.
- F.12 “IEC” means the International Electro technical Commission.
- F.13 “IEC 62301” means the document entitled “Household electrical appliances – Measurement of standby power”.
- F.14 “Independent Inspector” means the independent third party designated by the Steering Committee (on behalf of all Signatories) and who is tasked with, and responsible for, the collection and processing of information supplied by Signatories pursuant to Section 5.1 and Annex G, and determining a Signatory’s compliance with the Voluntary Agreement in accordance with Section 5.4. The Steering Committee shall engage the services of the Independent Inspector upon terms and conditions that shall require undertakings of confidentiality from the Independent Inspector, and which shall also set out any requirements or applicable mechanisms for a process of appeal, should this ever be necessary.
- F.15 “Internal Market” means the internal market as defined in the Treaty on the Functioning of the European Union.

- F.16 “Main Activity” means the principal commercial activity of a Signatory. For the avoidance of doubt, a Signatory is not precluded from undertaking more than one activity (as set out in Section 5.1 of the Voluntary Agreement), but it may only declare itself to have one Main Activity for the purposes of this Voluntary Agreement.
- F.17 “Member States” means the member states of the EU.
- F.18 “Quorum” means two thirds of the Signatories being present at a meeting.
- F.19 “Reporting Period” means the period within which the required information is to be submitted by a Signatory within 2 months after the end of that period.
- F.20 “Service Provider” means an entity that, whether by cable, satellite, terrestrial or telecommunications, provides video (and possibly other) content to subscribers with whom it has an ongoing contractual relationship. A Service Provider in the context of the Voluntary Agreement is one that supplies CSTBs to end users.
- F.21 “Signatories” means those companies or industry participants who sign this Voluntary Agreement, which shall include (but not be limited to) Equipment Manufacturers, Software Providers, Conditional Access Providers, Component Manufacturers and Service Providers.
- F.22 “Signature Date” means the date on which a company makes its commitment to this Voluntary Agreement and becomes a Signatory of this Voluntary Agreement.
- F.23 “Simple STB” means a standalone device which, irrespective of the interfaces used, has the primary function of converting standard-definition (SD) or high-definition (HD), free-to-air digital broadcast signals to analogue broadcast signals suitable for analogue television or radio, and has no ‘conditional access’ function.¹² For example, a STB that has an unpopulated Common Interface socket is a Simple STB. A STB that has a Common Interface socket which is populated with an active Common Interface Module is a Complex STB.
- F.24 “Software Provider” means a company who is responsible for producing the middleware and/or the operational software for the CSTB.
- F.25 “Steering Committee” means the co-ordinating and governing body of this Voluntary Agreement, appointed in accordance with the principles set out in Section 6.
- F.26 “Total Energy Consumption” or “TEC” means an assessment tool used in this specification that provides flexibility to approach the issue of energy efficiency while retaining a comparable metric to assess performance. In this specification, efficiency criteria are noted in terms of calculated total energy used over a year for a typical user (kWh/year) rather than energy (watts) for On and standby modes.
- F.27 “Tuner” means a tuner in the conventional sense, i.e. a tuner is a device or component that has the capability to demodulate physical transmissions from the DTV network at the electrical and mechanical level, corresponding to the OSI Physical Layer 1. Examples include DVB-S, DVB-T, DVB-C, DVB-H, ITU G.992.x (G.DMT etc), IEEE 802.16 (WiMAX). A tuner may also incorporate functionality from higher OSI layers (for example Ethernet), but to be classified as a “Tuner” for the purposes of this Voluntary Agreement it must provide OSI Layer 1 functionality and be used for the purpose of reception of digital media (DTV) content. A “Return Path” and an “Out-of-Band Tuner” is not considered a Tuner for the purposes of this Voluntary Agreement – see separate definitions. For the avoidance of doubt an Ethernet connector is not a Tuner as it does not provide OSI layer 1 functionality.
- F.28 “Voting Procedures” means the process for casting votes at the Steering Committee. A Signatory which reports under the Voluntary Agreement shall be entitled to cast a single vote for the Main Activity that it performs (in accordance with Section 5.1). The Voting Procedures will be carried out in a manner which ensures that a balanced representation of views between the various Signatories to this Voluntary Agreement is achieved at all times.

¹² See <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32009R0107&from=en> for SSTB regulation

ANNEX G – REPORTING PRO-FORMA

See cstb/eu for the current reporting template.

DRAFT

ANNEX H – SIGNING FORM

Voluntary Industry Agreement to improve the energy consumption of Complex Set Top Boxes within the EU

Name of Signatory:

Main Activity of Signatory

Signs this Voluntary Industry Agreement and commits to the overall objective of reducing the energy consumption of CSTBs within the EU as set out herein.

For each Reporting Period, the Signatory will provide information to the Independent Inspector detailing the energy consumption of each type of CSTB it manufactures, supplies, distributes or uses within the EU, as applicable, in accordance with Section 5.1 and Annex G of this Voluntary Industry Agreement.

Signatory agrees to this Signing Form being shared with Member States' representatives involved with regulation under the Ecodesign Directive 2009/125/EC.

For the Signatory:

Date:

Name of Authorised Representative:

Function of Authorised Representative:

Address of Signatory:

Company Registration No of Signatory:

Email:

Signature:

Please send a duly signed and completed Signing Form to:

The VA Steering Committee,
Technology Sectoral Governance INPO,
Herestraat 5,
B-3000 Leuven,
Belgium

And/ or return electronically to:

david.daniels@bskyb.com