STATEMENT BY VA STEERING COMMITTEE

Voluntary Agreement Completes Mission with 40% Energy Reduction

Exclusive Focus on Set-Top Boxes Outdated with Market Shift to Internet-Delivered Video

In 2009, when set-top box manufacturers and video service providers completed the first version of the *Voluntary Industry Agreement (VA) to improve the energy consumption of Complex Set Top Boxes (CSTBs) within the EU,* their set-top boxes were a large and growing contributor toward total residential energy usage, and were the only option for most consumers to access premium digital video programming. Since that time, radical changes in the video marketplace and significant improvements in the energy efficiency of set-top boxes and video service delivery have greatly diminished the relevance of the VA to ongoing energy policy in the 2020s. As a result, the parties have elected to terminate the VA as of the submission of this ninth and final annual report.

One reason that the VA is no longer necessary is that it has successfully accomplished its core objective. The average energy usage of CSTBs has fallen by 40% under the VA's commitments even as functionality has increased with support for high-definition and 4K content, improved interactive guides and search capabilities, home networking, and high efficiency video coding (HEVC).

A second reason that the VA is no longer necessary is that the CSTBs that comprise the scope of the current VA are no longer representative of the future of the video market. Consumers are increasingly watching Internet-delivered streaming video services as alternatives to traditional cable and satellite video services. These new services already have secured one-third of all video subscriptions in Europe and will likely near or surpass a majority by the mid-2020s. In addition, consumers are also increasingly accessing video without set-top boxes using apps on their tablets, smartphones, Smart TVs, and streaming devices such as dongles and sticks that are not covered by the CSTB VA. As a combined result of these trends, global set-top box purchases have fallen sharply, especially in markets such as Europe and North America where the cable and satellite markets were already mature. Even before the COVID-19 pandemic that is accelerating these trends, revenues from set-top box shipments to Europe are projected to drop by more than 40% from 2018 to 2023.[1] Purchases reported by the signatories for the ninth reporting period fell by 23% from the prior year, mirroring an 18% year-over-year decline in set-top box purchases reported by the video service provider signatories of a similar VA in the United States.

Maintaining a program that only covers declining traditional set-top boxes but not surging alternatives would be inconsistent with Commission requirements that self-regulation measures cover at least 80% of a relevant market to be recognized as alternatives to regulation under the Ecodesign Directive (2009/125/EC). Moreover, disparate treatment of equipment serving the same larger video marketplace could undermine competition and innovation.

But instead of expanding the VA to cover additional types of video devices, the signatories believe that the Commission's 801/2013 network standby requirements alone are more than adequate to meet energy usage policy objectives now that CSTB on mode power is substantially reduced under the VA.[2] The application of the network standby legislation to CSTBs superseded the intention of the VA to serve as a stand-alone self-regulatory program, and the existence of overlapping regulatory schemes unnecessarily increases costs and potential confusion.

For all of these reasons, the CSTB VA has successfully achieved its primary purpose and can be retired. Although the VA is concluding due to the transformation of the video market, the parties' conduct under the VA and the record of these annual reports may serve as a model for future self-governance measures, including openness of participation, added value, representativeness, quantified and staged objectives, involvement of civil society, monitoring and reporting, cost-effectiveness and sustainability. To assure that record of achievement is available transparently to all stakeholders, the Steering Committee of the VA decided to undergo additional cost to have this final report prepared by the Inspector to complete the record.

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[1] S&P Global Market Intelligence, *Total global set-top box shipments, revenue to decline through 2023* (20 November 2019).

[2] Ecodesign policy would be better served by a self-regulation measure for network standby and any other energy requirements for video and Internet service devices since these technologies continue to change rapidly.

NAVIGANT
A Guidehouse Company

Report of the Independent Inspector

to the VA on CSTBs – 9th Reporting Period 2018-2019

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Technology Sectoral Governance INPO

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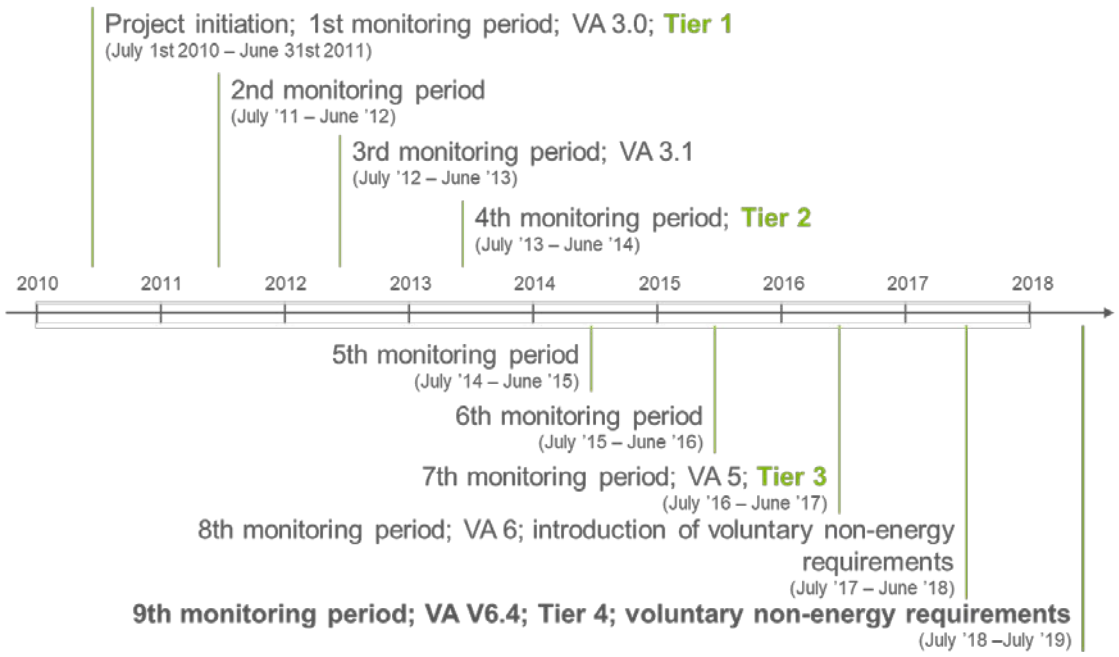
1. BACKGROUND

The *Voluntary Industry Agreement (VA) to improve the energy consumption of Complex Set Top Boxes (CSTBs) within the EU* became first effective on July 1, 2010 with version 3.0 (VA 3.0). Since then, the VA has gone through several amendments. It aimed 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."[1] National eco-labels like the German Blauer Engel[2] reference their award criteria directly to the VA. The following paragraphs provide details on how the signatories and their CSTBs perform today against the requirements of VA version 6.4 (VA 6.4).[3]

An Independent Inspector (the inspector) is assigned annually to inspect and report on the compliance to the VA's requirements. Ecofys, which became part of Navigant – A Guidehouse company in 2019, was selected for this role for the first reporting period and has been reselected thereafter. The historic development since project initiation, i.e., the introduction of new VA versions and the coming-to-force of advanced requirements ever since, is outlined in Figure 1.

Figure 1. Timeline from Project Initiation to Final Reporting Period Including Coming-Into-Force of New VA Versions and Advanced Requirements



Source: Navigant

The *Report of the Independent Inspector to the Voluntary Agreement on Complex Set Top Boxes* is commissioned by the VA steering committee and made available to the European Commission and Ecodesign stakeholders, e.g. members of the Consultation Forum established under Article 18 of the Ecodesign Directive.[4] Each report covers CSTB sales and purchases in a period of 12 months between July 1 and June 30 of the next year.

[1] Technology Sectoral Governance INPO, 2018, Introduction

[2] RAL gGmbH, 2017, section 3.2

[3] Technology Sectoral Governance INPO, 2019

[4] European Parliament and the Council of the European Union 2009

Throughout the years, the findings of the inspector are based on:

1. Confidential data received by the signatories in their reports
2. Queries to selected signatories and the chair
3. Compliance testing of one signatory's products by an independent testing laboratory

As explained in the Steering Committee's statement attached to this report, the VA is being terminated as of the submission of this final annual report. This report of the inspector outlining the findings of the ninth reporting period, through 2018-2019, (P9) and the retrospective evaluation of the VA during the nine years it was in force.

The contents of this report are as follows:

- Section 2 provides a retrospective on the VA.
- Section 3 explains the process of monitoring and inspection and outlines the data collection and processing methodology as well as the findings for reporting period 2018-2019.
- Section 4 provides final remarks.
- The Appendices provide the data that was requested and received from the signatories.

2. HISTORICAL OUTLOOK TO VA

2.1 CSTB market and transformation

Prior reports provided an estimate of the percentage of the CSTB market covered by the VA. However, over time, and, above all, recently the market has changed. Set-top box purchases have declined rapidly and alternative methods of accessing video have successfully entered the market. These changes make it more difficult to define the relevant market of the VA and accurately measure market coverage in 2020. In previous years, IHS Markit has estimated current coverage using historical data. Considering recent market developments, amongst signatories serious concerns have arisen about that previous approach still being adequate to assess market coverage because historical data no longer reflects the current, rapidly-changing market.

In its market coverage study, IHS estimated that more than 50 manufacturers ship CSTBs into the EU[5] in 2017 but many have now exited the market. In the past, if a signatory exited the STB market, it typically sold its business to a buyer that either was already a party to the VA or would be recruited to become one. IHS would assume that the former company's old market share was still covered by the VA through the buyer. This has changed in recent times: some former signatories to the VA have left the market and the VA and discontinued their CSTB products. In such cases, IHS treated the VA as losing its former market share, when in fact that share had evaporated (or been absorbed by other signatories). Therefore, in recent years it could appear that the VA was losing market share when in fact it was the CSTB market that was losing share.

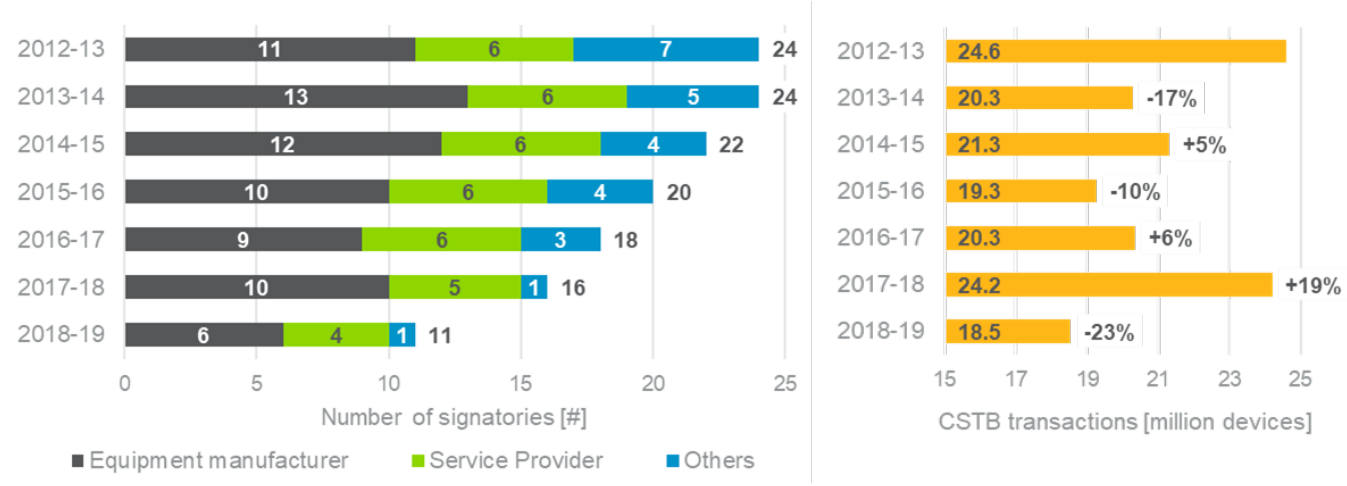
For the 2020s, within the VA signatories the question has come up whether it is still valid from an Ecodesign perspective to view a CSTB market as distinct from the broader market for all equipment used to access video programming.

The market for video services and the equipment used by consumers to access such services is dynamic, driven by sector players' interaction as well as the technological developments. The sector has gone through a technology shift with the increase in Internet distribution of television and other video content resulting uptake of other solutions such as USB access devices and smart software incorporated into televisions. For the period 2017-2018, the IHS Markit study projected an average overall market size of 26.4 million CSTBs where 24.2 million were put on market by VA signatories.[6] As can be seen in Figure 2, due to the developments explained above, both number of signatories and CSTB purchases have reached a new minimum since the VA's creation.

[5] IHS Markit, 2017

[6] IHS Markit projected total sales of 27.1 million CSTBs in full year 2017 and 25.8 million CSTBs in 2018. Since the VA defines periods from July 1 to June 30, the inspector considers the average of 26.4 million CSTBs.

Figure 2. Number of Reporting Signatories per Type (left) and Number of CSTBs Placed on the Internal Market (right) from 2012 to 2019

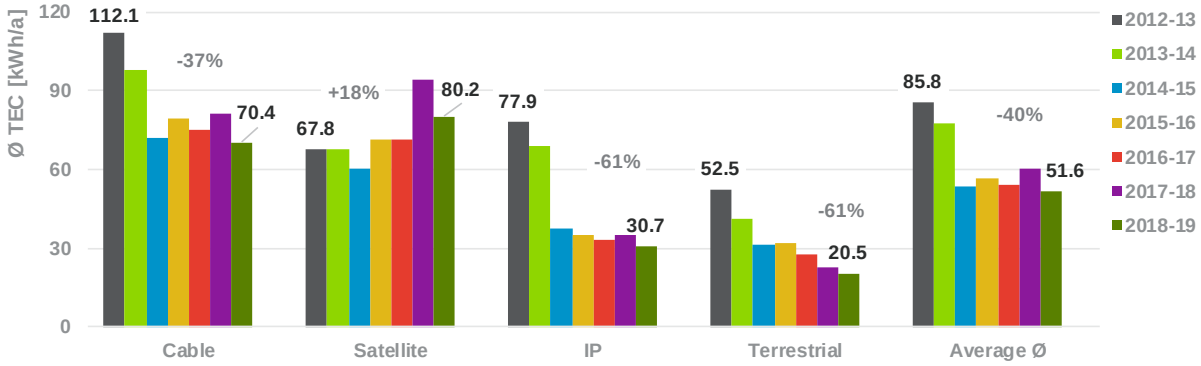


Source: Navigant

2.2 Energy consumption

Over the course of the VA, signatories managed to reduce the total energy consumption (TEC)[7] of most of their products by an average of 40% (see Figure 3, and year-over-year average TEC declined in P9 for all categories - cable, satellite, and IP-based CSTBs. The energy efficiency of terrestrial and IP CSTBs (with a slight increase in TEC in P8 of the latter) improved continuously. The data provided by signatories in 2018-2019 reporting period shows that IP and terrestrial CSTBs on average use 60% less than the energy they used in 2012-2013. Satellite devices consume 18% more energy today than in the past, although starting at a below-average level. This is partially due to a high number of additional functionalities, as Figure 7 indicates. A CSTB's total allowance is a good indicator for its complexity as additional allowances for additional features stack. This effect is not linear since different allowances per functionality apply as displayed in Table B-1. However, the effect works similarly for the different base functionalities as most allowances apply equally for all base

Figure 3. Historic Development of Average TEC per Base Functionality



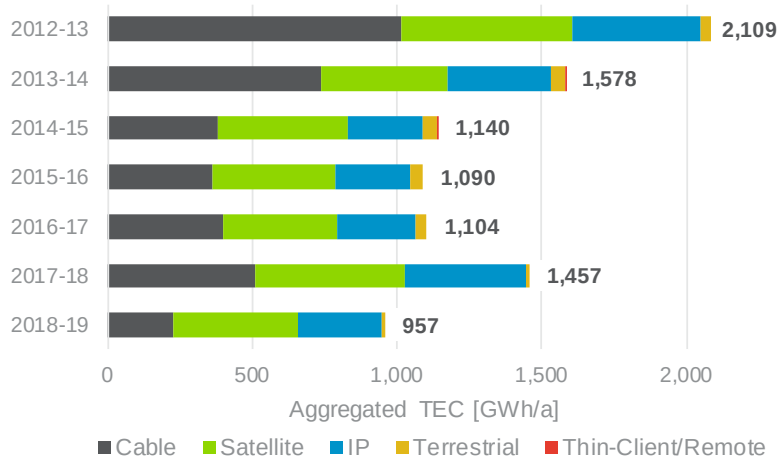
Source: Navigant

functionalities. For most cases it is reasonable to say the lower the TEC-to-allowance ratio, the more energy efficient the product.

[7] TEC calculation: TEC [kWh/a] = 0.365 [1/a] * (4.5h * On-Power [W] + 15h * Standby-Power [W] + 4.5h * APD-Power [W]); see VA 6.4, Annex C.

While the average power of new CSTBs has decreased by 40%, the total energy footprint of CSTBs has decreased even more because of the declining number of CSTBs in the market as consumers shift to Internet-delivered video alternatives. The total annual energy usage of the new CSTBs reported in P9 is 957 GWh, which is the lowest for any VA reporting period and less than half of the energy footprint of new CSTBs reported in P3 (see Figure 4).[8]

Figure 4. Theoretical Aggregated TEC of All CSTB transactions by Signatories per Period [GWh/a]



Source: Navigant

Despite stricter limitations with each VA revision, both, CSTBs reported by manufacturers and service providers, require 40%-60% of their eligible allowances in recent years (see Figure 5).

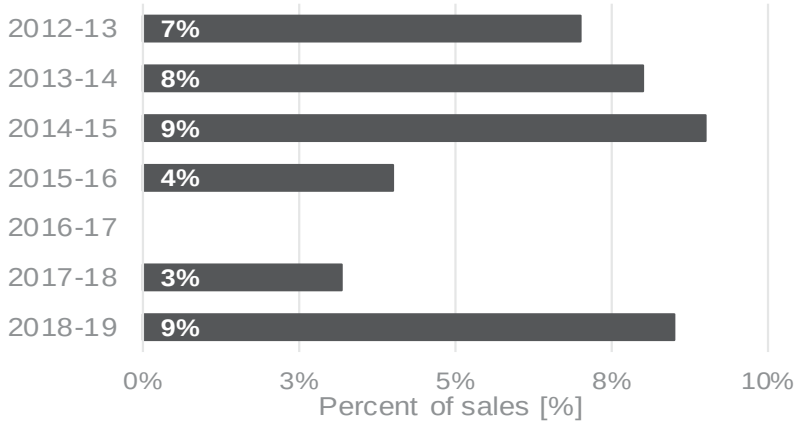
Figure 5. Average TEC (left) and Total Allowance used (right) per Signatory Type and Period

Source: Navigant

VA 6.4, article A.6 allows signatories to disable new innovative functionalities during testing, for which no allowances are listed in the VA's Annex D. No functionalities had been disabled for testing in the period 2016-2017 reporting. In the reports for P8 and P9 3% and 9% of transactions were flagged (see Figure 6), respectively.

[8] This applies under the assumption that all reported CSTBs are also deployed in P9, which probably was not the case as not all products procured by service providers were shipped from their suppliers and distributed to end consumers in the same period.

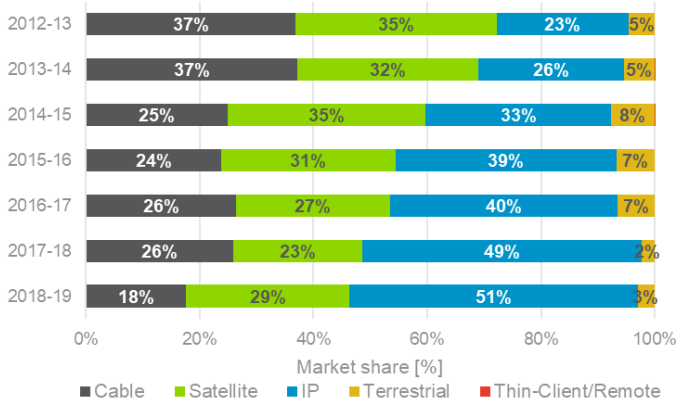
Figure 6. Transaction Shares of Units with New Innovative Functionality Disabled during Testing [%]



Source: Navigant

The base functionality of the CSTBs has also changed during the course of the VA. At the beginning of the VA, most sold CSTBs were cable-based (37%) followed by satellite devices (35%). Their share decreased over time. A clear trend was observed for the share of IP-devices. In recent years IP-devices show significant increase and currently IP devices make up for half of the CSTBs sold by signatories (51%), see Figure 7. Sales of thin-client or remote-devices have been below 1% in P1 and ceased in the past 3 years.

Figure 7. Market Shares per Base Functionality (2012-2019)



Source: Navigant

3. FINDINGS OF 9TH REPORTING PERIOD 2018-2019

3.1 Overview of reporting period

For this report, the inspector oversees compliance to version 6.4 of the VA (VA 6.4).[9] This version became public on August 2, 2019. In the 9th reporting period (P9), Tier 4 requirements were effective. VA 6.4 introduced voluntary non-energy requirements which were not mandatory in the 9th reporting period.

Ten companies provided reports for the 9th reporting period, see Table 1. With the retirement of the VA pending, signatories Advanced Digital Broadcast, Samsung, Sagemcom, SmartDTV and Viasat elected not to provide reports. An eleventh signatory, component supplier Texas Instruments, did not provide a report because it did not have reporting obligations.

Table 1. Table of Signatories

#	Company	Main Activity
1	Amino Communications	Equipment manufacturer
2	ARRIS	Equipment manufacturer
3	Humax Digital	Equipment manufacturer
4	Kaon Media	Equipment manufacturer
5	Sky Deutschland Fernsehen.	Service provider
6	Sky Italia Srl	Service provider
7	Sky UK	Service provider
8	Tatung Technology.	Equipment manufacturer
9	Technicolor	Equipment manufacturer
10	Telekom Deutschland	Service provider
11	Texas Instruments	Component manufacturer

Source: Chair of the VA

VA 6.4 includes further amendments for Tier 4 allowances which became effective in July 2018. Compared to VA 5, VA 6.4 brought increased base functionality allowances for cable, satellite, and terrestrial Complex Set Top Boxes (CSTBs). However, allowances for 14 additional functionalities were reduced or totally dismissed.

With VA 6.4 article A.10, obligations to provide customers with environmental information were implemented. Furthermore, VA 6.4 introduced 12 preliminarily non-binding non-energy requirements and respective verification criteria. These requirements cover production and packaging materials, and the application of sustainable design principles.

Table 2. VA 6.4: Non-Energy Requirements

Article	Targeted Aspects
F.01	Short chain chlorinated paraffins
F.02	Flame retardants
F.03	Brominated and chlorinated flame retardants
F.04	PVC
F.05	Post-consumer recycled content percentage

[9] Technology Sectoral Governance INPO, 2019

F.06	Bio-based plastic content percentage
F.07	Ease of disassembly
F.08	Plastics compatible with recycling
F.09	Product upgradability
F.10	Chlorine in packaging
F.11	Separable packing materials
F.12	Plastics in packaging

Source: VA 6.4, Annex F

3.2 Data Collection and Processing

Equipment manufacturers (manufacturers) and service providers were asked to fill a table-based reporting template for P9. An additional sheet was present to allow the voluntary assessment of non-energy requirements. Instructions on how to fill the reporting template were given to reduce clarification efforts. The target date for submitting these signatory reports to the inspector was set to September 30, 2019. This was one more month than usual to give more time for voluntarily compiling non-energy information. The queried information is provided in Appendix A of this report.

The inspector confirmed the receipt of signatory reports or statements and requested clarification where required:

- Missing, incomplete or unclear information
- Confirmation on assumptions of the inspector
- Sales of non-compliant products

3.3 Compliance Testing

Unlike previous years of reporting, the compliance testing was not carried out this year in agreement with the chair of VA due to termination of the VA.

3.4 Reporting

VA 6.4, article 7 states which contents shall be included in the annual report as a minimum:

- The contact details of the inspector
- The report authors
- The date of the report and reporting period
- The summary of the results presented
- The list of signatories and their obligations (manufacturer, service provider, or other)
- List of commitments and requirements on which signatories had to report
- Information on the data collection and processing method
- Information on the (non)compliance of each signatory
- Information about any reasons for non-compliance
- Summary (including results) of any tests and audits performed in the reporting period
- Any challenges in preparing the report, in particular in collecting or processing data from signatories
- Recommendations for the next reporting periods
- List of compliant and non-compliant signatories
- List of compliant models covered by this Voluntary Agreement

In addition to publishing this report with aggregated information, the inspector informed each signatory on its individual outcome. All statistics in this report are based on signatories' data, if no other source is explicitly named.

3.5 Results

3.5.1 Adjustments

The signatories reported total sales and procurements of 18.5 million devices in P9. Some products have been reported as sold by signatory manufacturers to signatory service providers which in turn reported these products as procured (N = 6.4 million). Historically inspector's report accounts for the fact of potential double counts. During P9 there were no model types that were reported by different signatories; therefore, no double counting was observed. Sales and procurements are considered as reported by signatories.

The following text summarizes sales and procurements as transactions.

3.5.2 Energy Consumption and Compliance

In this reporting period, 10 signatories with reporting obligations submitted reports including their transaction data.

Manufacturers' and service providers' compliance to VA 6.4 during P9 was analysed with respect to two obligations:

- Articles 4.2, 4.3 (TEC limitations)[10]
- Articles A.3[11], A.4[12] (APD requirements)

As Table 3 summarizes, three signatories reported products for P9 with TECs that exceed their allowances. One of these signatories did not reach the margin of 90%[13] compliant product commitment, at 88% and is overall non-compliant to VA 6.4. Except one model, the rest of the reported models within P9 provided an auto power down (APD) feature which runs after of no more than 4 hours by default.

Table 3. Compliance to VA 6.4 (N = 10 Reporting Signatories)

Main Obligation	Number of Signatories with Products Non-Compliant	Compliance Rate of all products
Articles 4.2, 4.3 (TEC limitations)	3	97.3%
Articles A.3, A.4 (APD requirement)	1	99.98%
Overall	**1**	**97.3%**

Source: Navigant

[10] VA 6.4, articles 4.2, 4.3: Equipment manufacturers and service providers shall "ensure that at least 90% of all CSTBs sold into the European Union in a given reporting period shall comply with the applicable energy consumption targets of the Voluntary Agreement"

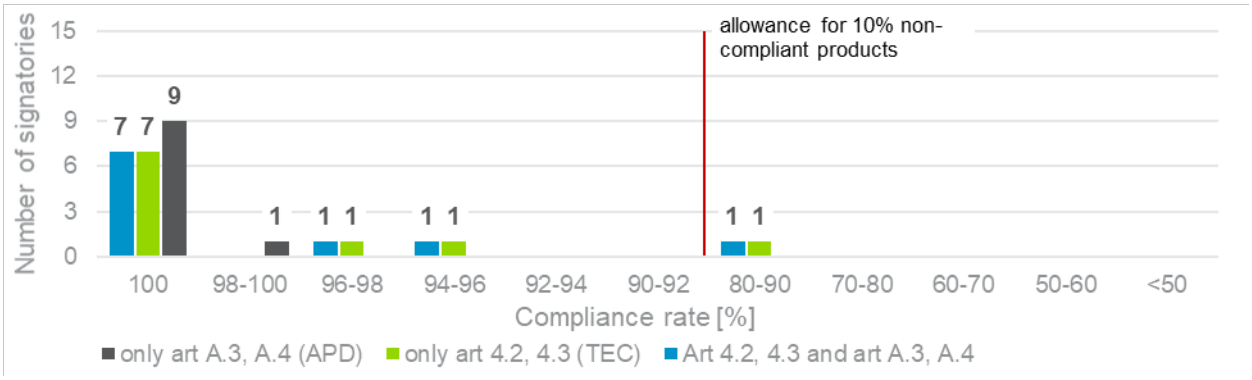
[11] VA 6.4, article A.3: "An Auto Power Down (APD) feature shall be provided and this shall be defaulted to "on" or "enabled" when installed by a service provider or shipped from a manufacturer."

[12] VA 6.4, article 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."

[13] VA 6.4, article 3: "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. An allowance of 10% will be made for such product."

Figure 8 further depicts the shares of compliant sales per signatory. As already mentioned, three signatories sold non-compliant products. However, only one signatory did not meet the 90% compliance margin since over 10% of their products exceeded the eligible TEC allowances. The remaining two signatories achieved compliance rates of above 96%. Seven signatories and their products complied 100% to VA 6.4 in P9.

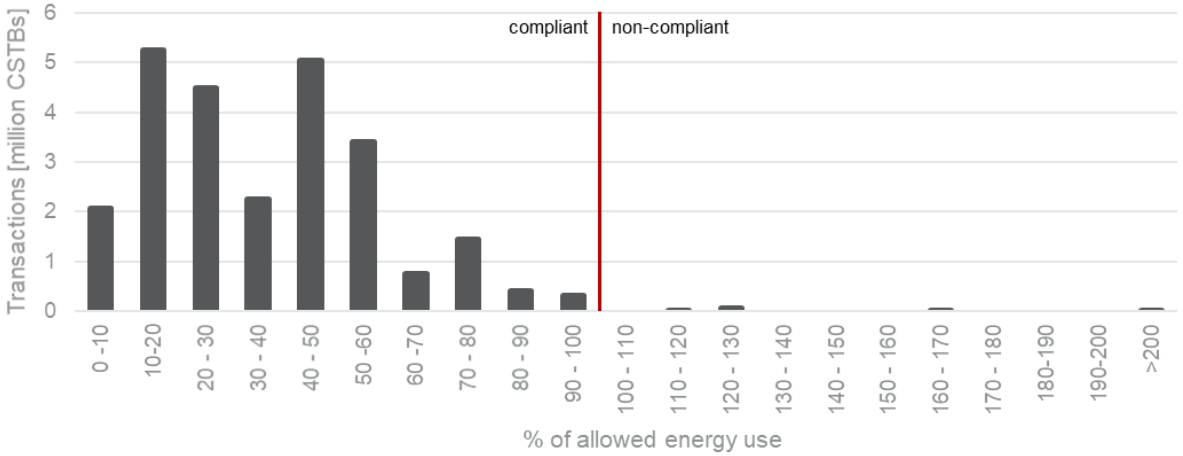
Figure 8. Number of Signatories per Compliance Rate (N = 10 Signatories)



Source: Navigant

The degree of how much energy CSTBs consume versus their allowance differed in P9. Some products required less than 10% of the allowed energy, few others (2.7% of reported products) required more than 100% of their allowance. TEC of majority of devices remain within 60% of their energy allowance, as Figure 9 shows. Overall, 97.3% of the products remained within their limits.

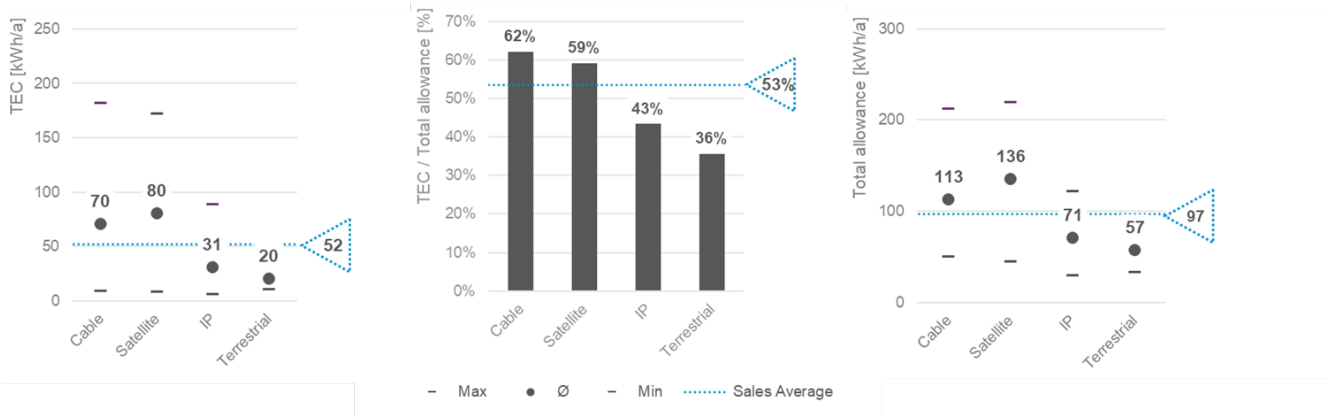
Figure 9. Transactions in Period 2018-2019 per Percentage of Allowed Energy Consumption



Source: Navigant

Figure 10 shows that satellite-based CSTBs achieve the highest total allowances on average, as well as the highest TEC. IP-based CSTBs achieve lower allowances than satellite-based ones but require approximately one-third of their TEC, resulting in about half of the TEC-to-allowance ratio.

Figure 10. Average, Minimal and Maximal TEC (left), Total Allowance (right) and TEC to Allowance Ratio (middle) per Base Functionality in Period 2018-2019.



Source: Navigant

Table 4 lists the compliance status per signatory in P9.

Table 4. Compliance Status per Reporting Signatory

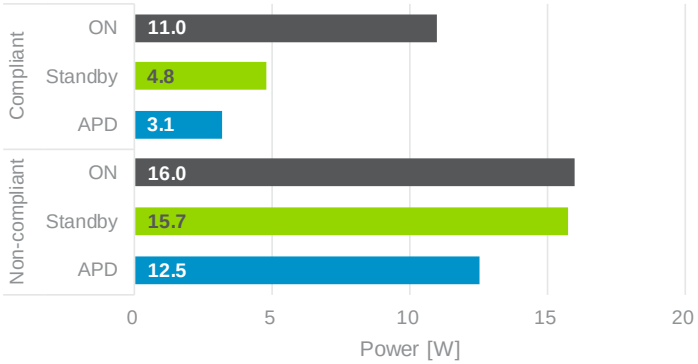
Company	Main activity	Compliance
Amino Communications	Equipment manufacturer	Compliant >= 90% to article 4.3 Compliant >= 90% to A.4
ARRIS	Equipment manufacturer	Compliant >= 90% to article 4.3 Compliant to A.4
Humax Digital	Equipment manufacturer	Compliant
Kaon Media	Equipment manufacturer	Compliant
Sky Deutschland Fernsehen	Service provider	Compliant
Sky Italia Srl	Service provider	Compliant
Sky UK	Service provider	Compliant
Tatung Technology	Equipment manufacturer	Compliant
Technicolor	Equipment manufacturer	Non-compliant (88% article 4.3)
Telekom Deutschland	Service provider	Compliant
Texas Instruments	Component manufacturer	No reporting obligation

- **Compliant:** 100% of products comply with VA 6.4, Tier 3 requirements
- **Compliant >=90%:** At least 90% of products comply with VA 6.4, Tier 3 requirements
- **Non-compliant:** Less than 90% of products comply with VA 6.4, Tier 3 requirements
- **No reporting obligation:** Signatory type other than equipment manufacturer or service provider

Source: Navigant

Figure 11 illustrates how compliant and non-compliant CSTBs differ in terms of the average energy consumption. ON-power differ by about 5 W (11 W vs. 16 W). However, non-compliant products require almost four times more energy of compliant models in standby (4.8W vs 15.7 W) and APD power (3.1 W vs 12.5 W). While compliant CSTBs on average reduce their energy consumption by half when switching to standby, non-compliant CSTBs only reduce their energy consumption by less than 1 W. CSTBs spend most of their service time in standby-mode. Since the few non-compliant products show only minor reductions of the energy consumption in standby-mode compared to compliant models, the inspector recommends for signatories to decrease standby-power for those few devices, too.

Figure 11. Average Power Consumption per Mode and Compliance Status



Source: Navigant

3.5.3 Findings on Other Articles

3.5.3.1 Speculative Recording (Annex A.8)

Annex A.8 provides that CSTBs supplied directly to retail end users not via a Service Provider must either enable end users to disable any speculative recording feature (typically push video-on-demand content) through a user-accessible menu option or upon user request, for example via a call centre.

Overall,

- Six reporting signatories did not sell direct to retail devices.
- One manufacturer and one service provider provide a user-accessible menu option allowing the user to disable this feature at will, with instructions provided in the manual.
- One service provider provides a user-accessible menu option allowing the user to disable this feature at will. However, the user has to call a service centre as the settings are accessible in a hidden service menu, which is not mentioned in the user manual.
- One service provider responded that respective devices do not provide a user-accessible menu option but disabling this feature is possible via the operator's website or by calling a service centre.

3.5.3.2 Environmental Characteristics (Annex A.10)

VA 6.4 reintroduced requirements for the reporting of environmental information to end users. As in the past, the reporting template queried service providers for a "URL where environmental characteristics and performance of CSTB-types are reported." If not available online, they were asked to state where the information for consumers can be found. All four service providers provided URLs.

3.5.3.3 Non-Energy Aspects (Annex F)

The reporting upon non-energy requirements was optional in P9. Eight signatories have reported non-energy requirements, two signatories did not provide reporting for non-energy requirements. Three

signatories have declared 100% compliance to Annex F requirements. Table 5 lists the compliance rate per signatory for Annex F requirements.

Table 5. Compliance Status per Reporting Signatory for non-energy requirements

Company	Main activity	Compliance rate
Amino Communications	Equipment manufacturer	0%
ARRIS	Equipment manufacturer	100%
Humax Digital	Equipment manufacturer	0%
Kaon Media	Equipment manufacturer	No report provided for Annex F
Sky Deutschland Fernsehen	Service provider	0%
Sky Italia Srl	Service provider	18%
Sky UK	Service provider	58%
Tatung Technology	Equipment manufacturer	100%
Technicolor	Equipment manufacturer	No report provided for Annex F
Telekom Deutschland	Service provider	100%

4. FINAL REMARKS

Since 2010, the average energy usage of set-top boxes decreased by 40% despite the implementation of additional innovative but energy consuming new and improved features. The overall energy usage of CSTBs decreased even more as the total number of CSTBs declined as a result of a shift to Internet-delivered streaming video. In the final reporting period, 97.3% of all reported set-top boxes met the Tier 4 requirements of VA 6.4, and the only reporting signatory that did not meet the compliance margin of at least 90%, came close at 88%. The share of reported set top boxes that have met the Tier requirements (the overall compliance rate of all signatories) has been typically significantly high since the beginning of the VA.

Table 6 Share of CSTBs that met VA requirements

VA reporting period	Compliance rate of all transactions
2010-2011 (P1)	98 %
2011-2012 (P2)	98 %
2012-2013 (P3)	99 %
2013-2014 (P4)	87 %
2014-2015 (P5)	94 %
2015-2016 (P6)	98 %
2016-2017 (P7)	99 %
2017-2018 (P8)	99 %
2018-2019 (P9)	97 %

These accomplishments provide evidence that voluntary agreements, as predicted by the Ecodesign Directive, can achieve quick and substantial progress due to rapid and cost-effective implementation and flexible and appropriate adaptations to changing technologies and market dynamics.

5. REFERENCES

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APPENDIX A. SIGNATORY REPORTING

A.1 Manufacturers and Service Providers

Manufacturers and service providers received a table-based reporting template that queried the following information:

Table A-1. General Information Queried from Signatories

General information
Name of Signatory
Company registration number
Main activity
4.8:*
URL where environmental characteristics and performance of CSTB-types are reported:
If this is not available online, please state where information can be found:
A.8, for devices with speculative recording functionality: *
Is there a user-accessible menu option allowing the user to disable this feature at will?
Is there a disable function that can be applied upon user request (for example via the service provider call centre)?
Are instructions provided for disabling speculative recording?

Source: VIA-reporting_template_v18.2.xlsx
** Service providers only*

The inspector investigated on article A.8 further via email, since the reporting template only requested this information from service providers while VA 6.4 states requirements for both service providers and manufacturers:

> *Did [Signatory] sell any Direct to retail devices with speculative recording in the reporting period (VA6.4, A.8)? If yes, please provide answer for following questions:*
>
> *a. Is there a user-accessible menu option allowing the user to disable this feature at will?*
> *b. Are instructions provided for disabling speculative recording?*

Table A-2. Energy-Related Information Queried from Signatories

CSTB-Specific Information: Energy-Related Aspects	
Brand	Multi-Encode
Model Type	Multi-Display
Base Functionality	In-Home Network
Supplied by mfg to Signatory Service Provider or Purchased from Signatory mfg	Access Point Router
NEW Innovative Functionality Disabled?	Telephony VOIP
High Efficiency Video Processing	Smart Home Services
Full HD	MIMO Wi-Fi 2.4GHz
Ultra HD	MIMO Wi-Fi 5GHz
3D-TV	Powerline
Advanced Graphics Processing	Community Wi-Fi
Additional RF channels - Cable or Satellite	Blu-Ray DVD Player/Recorder
Additional Channels IP or Terrestrial	On Power (W)
DVR	Standby Power (W)

CSTB-Specific Information: Energy-Related Aspects	
Return Path Functionality	Does Product Support APD?
DOCSIS 2.0 or ADSL	A.4: APD Support, What Is Default Time Period after which the CSTB Switches Itself into Standby (hours)?
VDSL	APD - What Is the Max APD Time That Can Be Selected, Maximum Permitted = 8 hours (Excluding Disabled - If Applicable)
DOCSIS 3.0	APD Power (W)
DOCSIS 3.0 Additional 4 Channels above 4	Mfg Only - Reported Using Test Software - Not Supplied with Final Software
Multi-Decode	Annual Sales Quantity Placed on the Internal Market During the Reporting Period?

Source: VIA-reporting_template_v18.2.xlsx

Table A-3. Non-Energy Information Queried from Signatories

CSTB-Specific Information: Non-Energy Requirements	
Short Chain Chlorinated Paraffins	Ease of Disassembly
Flame Retardants	Plastics Compatible with Recycling
Brominated and Chlorinated Flame Retardants	Product Upgradability
PVC	Chlorine in Packaging
Post-Consumer Recycled Content %	Separable Packing Materials
Bio-Based Plastic Content %	Plastics in Packaging

Source: VIA-reporting_template_for Tier 4_2018_19

A.2 Other Signatories

Signatories who are neither manufactures nor service providers were asked to elaborate on two questions as requested by VA 6.4, article 6.1:

- Which activities did your company carry out in the period July 2017-June 2018 to support the objectives of the VA?
- Which activities does your company plan to support the objectives of the VA?

APPENDIX B. ALLOWANCES

Table B-1 displays Tier 3 allowances, Tier 4 allowances and the difference between both Tiers. Compliance to Tier 4 requirements was mandatory in P9, which this report relates to.

Table B-1. Allowances as Defined in VA 6.4

Functionality	Annual Energy Allowance (kWh/Year)	
Base Functionality	**Tier 3** (01JULY16-30JUNE18)	**Tier 4** (01JULY18-30 JUNE 2019)
Cable	40	50 (+10)
Satellite	40	45 (+5)
IP	35	30 (-5)
Terrestrial	35	25 (-10)
Thin-Client/Remote	30	7 (-23)
Additional Functionalities	**Tier 3** (01JULY16-30JUNE18)	**Tier 4** (01JULY18-30 JUNE 2019)
High Efficiency Video Coding	20	12 (-8)
Full High Definition (1080p50 or above)	20	8 (-12)
Ultra High Definition (DVB Phase 1)	30	20 (-10)
3DTV None Stereoscopic Broadcast	20	8 (-12)
Advanced Graphic Processing	5	0 (-5)
Additional RF Channels Cable or Satellite	15	7 (-8)
Additional Channels IP or Terrestrial	8	4 (-4)
DVR	20	15 (-5)
Return Path Functionality	20	0 (-20)
Return Path Technology DOCSIS 2.0/ADSL	30	18 (-12)
Return Path Technology DOCSIS VDSL	40	40
Return Path Technology DOCSIS 3.0 (First 4 Channels)	50	25 (-25)
Return Path Technology DOCSIS 3.0 (per Additional 4 Channels)	10	5 (-5)
Multi-Decode	25	0 (-25)
Multi-Encode	10	0 (-10)
Multi-Display	6	0 (-6)
In-Home Network	15	12 (-3)
In-Home Networking Access Point-Router	30	15 (-15)
Telephony/VOIP	5	4 (-1)

Functionality	Annual Energy Allowance (kWh/Year)	
MIMO Wi-Fi 2.4GHz	3	3
MIMO Wi-Fi 5GHz	10	8 (-2)
Powerline	10	10
Community Wi-Fi	3	3

Source: VA 6.4

APPENDIX C. LIST OF COMPLIANT CSTB

Signatory	Model Type
Amino Communications	H150
Amino Communications	Kamai 510
Amino Communications	Kamai 510X
Amino Communications	Amulet 515
Amino Communications	Kamai 661
Amino Communications	Aria 610
Amino Communications	Aria 610X
Amino Communications	Amigo 7X
Amino Communications	Kamai 7B
Amino Communications	Kamai 7X
Amino Communications	Kamai 7E
Amino Communications	Aria 7
Amino Communications	Aria 7X
ARRIS	DCX960
ARRIS	DCX960 D/L
ARRIS	DMC7002KLG
ARRIS	DMC7002KLG D/L
ARRIS	DPS5002NS
ARRIS	DZC3000NGT
ARRIS	DZS3000NV
ARRIS	DZS3001IFN
ARRIS	HMC4120
ARRIS	VIP1113
ARRIS	VIP2262EV2
ARRIS	VIP2853
ARRIS	VIP2853C
ARRIS	VIP2952 V2
ARRIS	VIP4205
ARRIS	VIP4302
ARRIS	VIP4302W
ARRIS	VIP5202
ARRIS	VIP5242
ARRIS	VIP5242V2
ARRIS	VIP5242W
ARRIS	VIP5305
ARRIS	VIP5305W
ARRIS	VIP5602EW
ARRIS	VIP5662EW
ARRIS	ZC4110OVE

Signatory	Model Type
ARRIS	ZC4430KNO
ARRIS	ZD4500ZNO
ARRIS	ZH4110NS
Humax	Kabel HD NANO
Humax	CXHD-6000C/SE
Humax	YSR-2000/DK
Humax	YS-4000
Humax	CDIG-1000C
Humax	DTR-T2100
Humax	DTR-T2110
Humax	DTR-T2120
Humax	DB-T2200
Humax	DB-T2220
Humax	DTR-T4000
Humax	1008C-STB
Humax	1008C-HDD
Humax	IRHD-5500C
Humax	DIGI+C HD4
Humax	IRHD-5300C
Humax	HDR-1000S
Humax	DTR-T1010
Humax	HDR-2000T
Humax	DTR-2000T
Humax	HDR-1800T
Humax	FVP-4000T
Humax	HDR-1100S
Humax	HB-1100S
Humax	FVP-5000T
Humax	GNM-1000
Humax	GTN-1008S
Humax	OS-4000HA
Humax	PTT-1000
Humax	TN8000HD
Humax	HD-6400S
Humax	HD-6600S
Humax	HD-6800S
Humax	H3
Kaon Media	KSTB5028

Signatory	Model Type
Kaon Media	KSTB1001
Kaon Media	KSTB4082
Kaon Media	KSTB5029
Kaon Media	KSTB5030
Kaon Media	KSTB6077
Kaon Media	KSTB6077
Kaon Media	KSTB6077
Kaon Media	KSTB6077
Kaon Media	KSTB6073
Kaon Media	NA1000HD
Kaon Media	KSTB1106
Kaon Media	KSTB6029
Kaon Media	KSTB2096
Kaon Media	NA1170
Kaon Media	KSTB4021
Kaon Media	KSTB3019
Kaon Media	KSTB4019
Kaon Media	KSTB5019
Kaon Media	KSTB4020
Kaon Media	KSTB5020
Kaon Media	KSTB6020
Kaon Media	NS2000
Kaon Media	KSTB2046
SKY ITALIA	ESi-160
Humax	TN8000HD
Humax	HD-6400S
Humax	HD-6600S
Humax	HD-6800S
Humax	H3
Kaon Media	KSTB5028
Kaon Media	KSTB1001
Kaon Media	KSTB4082
Kaon Media	KSTB5029
Kaon Media	KSTB5030
Kaon Media	KSTB6077
Kaon Media	KSTB6077
Kaon Media	KSTB6077
Kaon Media	KSTB6073
Kaon Media	NA1000HD
Kaon Media	KSTB1106
Kaon Media	KSTB6029

Signatory	Model Type
Kaon Media	KSTB2096
Kaon Media	NA1170
Kaon Media	KSTB4021
Kaon Media	KSTB3019
Kaon Media	KSTB4019
Kaon Media	KSTB5019
Kaon Media	KSTB4020
Kaon Media	KSTB5020
Kaon Media	KSTB6020
Kaon Media	NS2000
Kaon Media	KSTB2046
SKY ITALIA	ESi-160
SKY ITALIA	ESi240
SKY ITALIA	EM150IT
Sky UK	ES130
Sky UK	EM150
Sky UK	ES240
Sky Deutschland Fernsehen Gmbh & Co. KG	ESD-160S
Sky Deutschland Fernsehen Gmbh & Co. KG	ESD-160S (DTV)
Sky Deutschland Fernsehen Gmbh & Co. KG	ESD-160C
Sky Deutschland Fernsehen Gmbh & Co. KG	ESD-160C (DTV)
Tatung Technology Inc.	MR401WS
Tatung Technology Inc.	MR201
Tatung Technology Inc.	MR401SW
Tatung Technology Inc.	MR601
Tatung Technology Inc.	STB-3112CDA
Tatung Technology Inc.	STB-3012CDA
Technicolor	ISB8430
Technicolor	UZW8020CHM
Technicolor	DSI424COS
Technicolor	USW4001
Technicolor	USX8001
Technicolor	UZW4010TIM2
Technicolor	UZW4030
Technicolor	DCI765EKT
Technicolor	IPV5001

Signatory	Model Type
Technicolor	HIE4008
Technicolor	ISB2231
Technicolor	ISB2201
Technicolor	DWT765MM
Technicolor	UIW4020PXM
Technicolor	S70CDS
Telekom Deutschland GmbH	Media Receiver 201
Telekom Deutschland GmbH	Media Receiver 401 Typ B
Telekom Deutschland GmbH	Media Receiver 601 Sat

APPENDIX D. CSTB PROPERTIES

Base Functionality	High Efficiency Video Processing	Full HD	Ultra HD	3D-TV	Additional RF channels	Additional channels IP or Terrestrial	DVR	DOCSIS 2.0 or ADSL	VDSL	DOCSIS 3.0	DOCSIS 3.0 additional 4 channels above 4	In home network	Access point Router	Telephony VOIP	Smart Home Services	MIMO Wi-Fi 2.4GHz	MIMO Wi-Fi 5GHz	Powerline	Community Wi-Fi	Blu-Ray DVD player /recorder	On Power (W)	Standby Power (W)	Does product support APD?	The default time period after which the CSTB switches itself into standby (hrs)?	The max APD time	APD Power (W)	Product Annual Energy Consumption (kWh/year)
Cable	No	yes	No	Yes	3	0	Yes	No	No	Yes	3	Yes	Yes	Yes	No	2	3	No	3	No	23.76	21.70	Yes	3.5	8	14.48	181.62
Cable	Yes	yes	No	No	7	0	Yes	No	No	No	0	Yes	No	No	No	0	0	No	0	No	20.70	20.40	Yes	4	8	20.70	179.69
Satellite	Yes	no	Yes	No	9	0	Yes	No	No	No	0	Yes	Yes	No	No	2	3	No	0	No	29.00	17.55	Yes	4	4	17.55	172.54
Satellite	Yes	no	Yes	No	9	2	Yes	No	No	No	0	Yes	Yes	No	No	2	3	No	0	No	29.00	16.50	Yes	4		16.50	165.07
Cable	No	yes	No	Yes	3	0	No	No	No	Yes	3	Yes	Yes	Yes	No	2	3	No	3	No	18.68	17.95	Yes	4	8	14.11	152.13
Satellite	No	yes	No	No	7	0	Yes	No	No	No	0	Yes	Yes	No	No	2	3	Yes	0	No	18.37	15.09	Yes	4	4	15.09	137.58
Satellite	Yes	no	Yes	No	7	0	Yes	No	No	No	0	Yes	No	No	No	0	2	No	0	No	16.70	10.24	Yes	4		10.24	100.31
Satellite	No	no	No	No	1	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	13.81	12.83	Yes	4	8	0.35	93.50
IP	Yes	no	Yes	No	0	0	Yes	No	No	No	0	Yes	No	No	No	0	4	No	0	No	15.42	11.51	Yes	4	8	0.46	89.10
Cable	Yes	yes	No	No	1	0	Yes	No	No	No	0	Yes	No	No	No	0	3	No	0	No	12.75	11.76	Yes	4	8	0.44	86.05

Base Functionality	High Efficiency Video Processing	Full HD	Ultra HD	3D-TV	Additional RF channels	Additional channels IP or Terrestrial	DVR	DOCSIS 2.0 or ADSL	VDSL	DOCSIS 3.0	DOCSIS 3.0 additional 4 channels above 4	In home network	Access point Router	Telephony VOIP	Smart Home Services	MIMO Wi-Fi 2.4GHz	MIMO Wi-Fi 5GHz	Powerline	Community Wi-Fi	Blu-Ray DVD player /recorder	On Power (W)	Standby Power (W)	Does product support APD?	The default time period after which the CSTB switches itself into standby (hrs)?	The max APD time	APD Power (W)	Product Annual Energy Consumption (kWh/year)
IP	No	no	No	No	0	1	No	No	No	No	0	Yes	No	No	No	0	4	No	0	No	12.25	11.85	Yes	4	8	0.30	85.49
IP	No	no	No	No	0	4	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	13.21	10.84	Yes	4	8	0.30	81.54
IP	Yes	no	Yes	No	0	0	No	No	No	No	0	Yes	No	No	No	0	4	No	0	No	12.17	10.71	Yes	4	8	0.46	79.38
IP	No	yes	No	No	0	0	No	No	No	No	0	Yes	Yes	No	No	2	3	Yes	0	No	9.77	7.84	Yes	4	4	7.84	71.85
Cable	Yes	yes	No	No	1	0	No	No	No	No	0	Yes	No	No	No	0	3	No	0	No	10.64	9.78	Yes	4	8	0.42	71.71
IP	No	no	No	No	0	1	No	No	No	No	0	Yes	No	No	No	2	3	No	0	No	10.10	7.63	Yes	4		7.63	70.90
Satellite	No	no	No	No	1	1	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	11.67	9.09	Yes	4	8	0.27	69.38
IP	No	no	No	No	0	4	Yes	No	No	No	0	Yes	No	No	No	0	0	No	0	No	10.25	8.90	Yes	4	8	0.30	66.06
Satellite	Yes	yes	Yes	No	2	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	19.03	5.97	Yes	4	8	0.43	64.65
IP	Yes	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	9.77	7.69	Yes	4	8	0.41	58.82
IP	No	no	No	No	0	1	No	No	No	No	0	No	No	No	No	0	0	No	0	No	7.93	8.20	Yes	4	8	0.40	58.58
IP	Yes	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	8.43	6.31	Yes	4	8	0.41	49.07

Base Functionality	High Efficiency Video Processing	Full HD	Ultra HD	3D-TV	Additional RF channels	Additional channels IP or Terrestrial	DVR	DOCSIS 2.0 or ADSL	VDSL	DOCSIS 3.0	DOCSIS 3.0 additional 4 channels above 4	In home network	Access point Router	Telephony VOIP	Smart Home Services	MIMO Wi-Fi 2.4GHz	MIMO Wi-Fi 5GHz	Powerline	Community Wi-Fi	Blu-Ray DVD player /recorder	On Power (W)	Standby Power (W)	Does product support APD?	The default time period after which the CSTB switches itself into standby (hrs)?	The max APD time	APD Power (W)	Product Annual Energy Consumption (kWh/year)
Satellite	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.53	5.50	Yes	4	8	5.53	48.28
Cable	Yes	no	Yes	No	3	0	No	Yes	No	No	0	Yes	No	No	No	0	0	No	0	No	12.53	3.75	Yes	4	8	3.70	47.19
Cable	No	no	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	6.72	6.15	Yes	3	6	0.39	45.35
IP	Yes	yes	Yes	No	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	7.31	5.81	Yes	4	8	0.41	44.49
IP	Yes	yes	Yes	No	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	6.97	5.39	Yes	4	8	0.43	41.66
IP	Yes	yes	Yes	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	6.79	5.22	Yes	4	8	0.41	40.41
IP	No	no	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.71	4.28	Yes	4	8	4.53	40.25
Cable	No	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	2	2	No	0	No	14.90	1.98	Yes	3	8	1.98	38.57
Cable	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	2	2	No	0	No	14.90	1.97	Yes	3	8	1.97	38.49
Satellite	No	no	No	No	0	1	No	No	No	No	0	Yes	No	No	No	0	2	No	0	No	5.75	5.14	Yes	4	8	0.16	37.85
Terrestrial	No	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	22.00	0.21	Yes	3	8	0.21	37.63
IP	No	no	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	4.95	3.90	Yes	4	8	4.10	36.22

Base Functionality	High Efficiency Video Processing	Full HD	Ultra HD	3D-TV	Additional RF channels	Additional channels IP or Terrestrial	DVR	DOCSIS 2.0 or ADSL	VDSL	DOCSIS 3.0	DOCSIS 3.0 additional 4 channels above 4	In home network	Access point Router	Telephony VOIP	Smart Home Services	MIMO Wi-Fi 2.4GHz	MIMO Wi-Fi 5GHz	Powerline	Community Wi-Fi	Blu-Ray DVD player /recorder	On Power (W)	Standby Power (W)	Does product support APD?	The default time period after which the CSTB switches itself into standby (hrs)?	The max APD time	APD Power (W)	Product Annual Energy Consumption (kWh/year)
Satellite	Yes	no	Yes	No	2	1	No	No	No	No	0	No	No	No	No	1	1	No	1	No	13.51	1.97	Yes	4	8	1.97	36.20
Cable	No	no	No	No	0	0	No	Yes	No	No	0	No	No	No	No	0	0	No	0	No	5.01	5.01	Yes	3	8	0.27	36.08
IP	No	no	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	4.50	3.87	No				35.97
Satellite	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	4	No	0	No	19.15	0.45	Yes	3	8	0.45	34.66
Satellite	No	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	18.46	0.35	Yes	3	8	0.35	32.81
Cable	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	17.70	0.40	Yes	3	8	0.40	31.92
Satellite	No	no	No	No	0	0	No	No	No	No	0	Yes	No	No	No	0	0	No	0	No	5.07	4.19	Yes	4	8	0.19	31.58
Satellite	Yes	no	Yes	No	1	0	Yes	No	No	No	0	No	No	No	No	1	1	No	0	No	16.80	0.45	Yes	4	4	0.45	30.80
Satellite	Yes	no	Yes	No	1	0	Yes	No	No	No	0	No	No	No	No	1	1	No	0	No	16.90	0.42	Yes	4	4	0.42	30.75
Cable	Yes	no	Yes	No	1	0	Yes	No	No	No	0	No	No	No	No	1	1	No	0	No	16.70	0.45	Yes	4	4	0.45	30.63
Cable	Yes	no	Yes	No	1	0	Yes	No	No	No	0	No	No	No	No	1	1	No	0	No	16.70	0.44	Yes	4	4	0.44	30.56
IP	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	4.10	3.62	Yes	4	8	2.36	30.43

Base Functionality	High Efficiency Video Processing	Full HD	Ultra HD	3D-TV	Additional RF channels	Additional channels IP or Terrestrial	DVR	DOCSIS 2.0 or ADSL	VDSL	DOCSIS 3.0	DOCSIS 3.0 additional 4 channels above 4	In home network	Access point Router	Telephony VOIP	Smart Home Services	MIMO Wi-Fi 2.4GHz	MIMO Wi-Fi 5GHz	Powerline	Community Wi-Fi	Blu-Ray DVD player /recorder	On Power (W)	Standby Power (W)	Does product support APD?	The default time period after which the CSTB switches itself into standby (hrs)?	The max APD time	APD Power (W)	Product Annual Energy Consumption (kWh/year)
Terrestrial	No	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	2	2	No	0	No	16.40	0.42	Yes	3	8	0.42	29.93
Terrestrial	No	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	2	2	No	0	No	16.40	0.42	Yes	3	8	0.42	29.93
Satellite	Yes	no	Yes	No	1	1	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	15.06	0.45	Yes	4	8	0.45	27.94
Terrestrial	No	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	15.22	0.29	Yes	3	8	0.29	27.06
Terrestrial	No	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	14.90	0.36	Yes	3	8	0.36	27.04
Terrestrial	No	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	14.20	0.40	Yes	3	8	0.40	26.17
Cable	No	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	2	4	No	0	No	14.70	0.28	Yes	3	8	0.28	26.14
Terrestrial	No	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	14.18	0.40	Yes	3	8	0.40	26.14
Satellite	No	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	2	2	No	0	No	13.50	0.24	Yes	3	8	0.24	23.88
Cable	Yes	yes	No	No	0	1	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	6.33	1.77	Yes	4	8	1.77	23.01

Base Functionality	High Efficiency Video Processing	Full HD	Ultra HD	3D-TV	Additional RF channels	Additional channels IP or Terrestrial	DVR	DOCSIS 2.0 or ADSL	VDSL	DOCSIS 3.0	DOCSIS 3.0 additional 4 channels above 4	In home network	Access point Router	Telephony VOIP	Smart Home Services	MIMO Wi-Fi 2.4GHz	MIMO Wi-Fi 5GHz	Powerline	Community Wi-Fi	Blu-Ray DVD player /recorder	On Power (W)	Standby Power (W)	Does product support APD?	The default time period after which the CSTB switches itself into standby (hrs)?	The max APD time	APD Power (W)	Product Annual Energy Consumption (kWh/year)
Cable	No	yes	No	No	3	0	Yes	Yes	No	No	0	No	No	No	No	0	0	No	0	No	12.21	0.36	Yes	4	6	0.36	22.62
Cable	No	yes	No	No	5	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	12.03	0.37	Yes	4	8	0.37	22.39
IP	Yes	no	Yes	No	0	1	No	No	No	No	0	No	No	No	No	0	0	Yes	0	No	5.72	1.80	Yes	4	8	1.80	22.21
Satellite	Yes	no	Yes	No	2	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	12.17	0.29	Yes	4	8	0.29	22.02
Satellite	Yes	no	Yes	No	2	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	12.17	0.29	Yes	4	8	0.29	22.02
IP	Yes	no	Yes	No	0	4	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.64	1.72	Yes	4	8	1.72	21.52
IP	No	no	No	No	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	11.51	0.36	Yes	4	8	0.36	21.47
IP	No	yes	No	Yes	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	9.80	0.75	Yes	1	8	0.75	21.44
IP	Yes	no	Yes	No	0	1	No	No	No	No	0	No	No	No	No	0	0	No	0	No	3.80	2.54	Yes	4	8	0.48	20.95
IP	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	10.44	0.45	Yes	3	8	0.45	20.35
Terrestrial	No	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	11.30	0.24	Yes	3	8	0.24	20.27

Base Functionality	High Efficiency Video Processing	Full HD	Ultra HD	3D-TV	Additional RF channels	Additional channels IP or Terrestrial	DVR	DOCSIS 2.0 or ADSL	VDSL	DOCSIS 3.0	DOCSIS 3.0 additional 4 channels above 4	In home network	Access point Router	Telephony VOIP	Smart Home Services	MIMO Wi-Fi 2.4GHz	MIMO Wi-Fi 5GHz	Powerline	Community Wi-Fi	Blu-Ray DVD player /recorder	On Power (W)	Standby Power (W)	Does product support APD?	The default time period after which the CSTB switches itself into standby (hrs)?	The max APD time	APD Power (W)	Product Annual Energy Consumption (kWh/year)
Terrestrial	No	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	11.30	0.24	Yes	3	8	0.24	20.27
Terrestrial	No	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	11.30	0.24	Yes	3	8	0.24	20.27
Satellite	Yes	yes	No	No	0	0	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	10.80	0.35	Yes	1	8	0.35	20.23
Satellite	Yes	yes	No	No	0	1	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	10.50	0.41	Yes	1	8	0.41	20.16
Satellite	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	10.26	0.40	Yes	3	8	0.40	19.70
IP	Yes	no	Yes	No	0	1	No	No	No	No	0	Yes	No	No	No	0	2	No	0	No	6.45	1.28	Yes	4	8	1.28	19.69
IP	Yes	no	Yes	No	0	1	Yes	No	No	No	0	No	No	No	No	0	0	No	0	No	9.90	0.37	Yes	4	8	0.37	18.89
Cable	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	4	4	No	0	No	9.10	0.49	Yes	3	8	0.49	18.43
IP	Yes	no	Yes	Yes	0	4	No	No	No	No	0	No	No	No	No	0	0	No	0	No	7.70	0.45	Yes	4	8	2.01	18.42
IP	No	no	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	9.64	0.36	Yes	4	8	0.37	18.41
IP	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	9.23	0.45	Yes	3	8	0.45	18.36

Base Functionality	High Efficiency Video Processing	Full HD	Ultra HD	3D-TV	Additional RF channels	Additional channels IP or Terrestrial	DVR	DOCSIS 2.0 or ADSL	VDSL	DOCSIS 3.0	DOCSIS 3.0 additional 4 channels above 4	In home network	Access point Router	Telephony VOIP	Smart Home Services	MIMO Wi-Fi 2.4GHz	MIMO Wi-Fi 5GHz	Powerline	Community Wi-Fi	Blu-Ray DVD player /recorder	On Power (W)	Standby Power (W)	Does product support APD?	The default time period after which the CSTB switches itself into standby (hrs)?	The max APD time	APD Power (W)	Product Annual Energy Consumption (kWh/year)
IP	Yes	no	Yes	No	0	1	No	No	No	No	0	Yes	No	No	No	0	4	No	0	No	9.75	0.29	Yes	4	8	0.29	18.08
IP	Yes	yes	Yes	Yes	0	0	No	No	No	No	0	Yes	No	No	No	0	4	No	0	No	8.80	0.40	Yes	1	8	0.40	17.30
Satellite	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	8.50	0.40	Yes	3	8	0.40	16.81
Satellite	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	8.50	0.40	Yes	3	8	0.40	16.81
Satellite	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	8.50	0.40	Yes	3	8	0.40	16.81
Cable	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	8.10	0.45	Yes	3	8	0.45	16.51
Satellite	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	2	2	No	0	No	7.90	0.45	Yes	3	8	0.45	16.18
Terrestrial	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	7.58	0.45	Yes	3	8	0.45	15.65
Terrestrial	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	7.58	0.45	Yes	3	8	0.45	15.65
IP	Yes	no	Yes	No	0	0	No	No	No	No	0	Yes	No	No	No	0	2	No	0	No	5.00	1.20	Yes	4	8	0.34	15.34
IP	Yes	no	Yes	No	0	1	No	No	No	No	0	No	No	No	No	0	0	No	0	No	8.10	0.27	Yes	4	8	0.27	15.23

Base Functionality	High Efficiency Video Processing	Full HD	Ultra HD	3D-TV	Additional RF channels	Additional channels IP or Terrestrial	DVR	DOCSIS 2.0 or ADSL	VDSL	DOCSIS 3.0	DOCSIS 3.0 additional 4 channels above 4	In home network	Access point Router	Telephony VOIP	Smart Home Services	MIMO Wi-Fi 2.4GHz	MIMO Wi-Fi 5GHz	Powerline	Community Wi-Fi	Blu-Ray DVD player /recorder	On Power (W)	Standby Power (W)	Does product support APD?	The default time period after which the CSTB switches itself into standby (hrs)?	The max APD time	APD Power (W)	Product Annual Energy Consumption (kWh/year)
Cable	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	7.30	0.45	Yes	3	8	0.45	15.19
Cable	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	7.30	0.45	Yes	3	8	0.45	15.19
IP	Yes	no	Yes	No	0	1	No	No	No	No	0	No	No	No	No	0	0	No	0	No	8.00	0.29	Yes	4	8	0.28	15.19
IP	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	7.20	0.45	Yes	3	8	0.45	15.03
IP	No	yes	No	Yes	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.60	0.80	Yes	1	8	0.80	14.89
IP	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	2	2	No	0	No	3.81	1.20	Yes	3	8	1.20	14.80
IP	Yes	yes	Yes	Yes	0	0	No	No	No	No	0	Yes	No	No	No	0	4	No	0	No	6.96	0.47	Yes	1	8	0.47	14.78
IP	Yes	no	Yes	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	4.00	1.20	Yes	4	8	0.34	13.70
Cable	No	yes	No	No	1	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	6.80	0.25	Yes	4	8	0.25	12.95
Cable	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	6.20	0.38	Yes	3	8	0.38	12.89
IP	Yes	yes	No	No	0	0	No	No	No	No	0	Yes	No	No	No	0	2	No	0	No	5.72	0.49	Yes	4	8	0.49	12.88
IP	Yes	yes	Yes	Yes	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.80	0.47	Yes	1	8	0.47	12.87

Base Functionality	High Efficiency Video Processing	Full HD	Ultra HD	3D-TV	Additional RF channels	Additional channels IP or Terrestrial	DVR	DOCSIS 2.0 or ADSL	VDSL	DOCSIS 3.0	DOCSIS 3.0 additional 4 channels above 4	In home network	Access point Router	Telephony VOIP	Smart Home Services	MIMO Wi-Fi 2.4GHz	MIMO Wi-Fi 5GHz	Powerline	Community Wi-Fi	Blu-Ray DVD player /recorder	On Power (W)	Standby Power (W)	Does product support APD?	The default time period after which the CSTB switches itself into standby (hrs)?	The max APD time	APD Power (W)	Product Annual Energy Consumption (kWh/year)
IP	Yes	yes	No	Yes	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.60	0.48	Yes	1	8	0.48	12.61
Terrestrial	Yes	no	Yes	No	0	0	No	No	No	No	0	Yes	No	No	No	2	2	No	0	No	5.80	0.43	Yes	1	8	0.43	12.59
Terrestrial	Yes	no	Yes	No	0	0	No	No	No	No	0	Yes	No	No	No	2	2	No	0	No	5.80	0.43	Yes	1	8	0.43	12.59
Terrestrial	Yes	no	Yes	No	0	0	No	No	No	No	0	Yes	No	No	No	2	2	No	0	No	5.80	0.43	Yes	1	8	0.43	12.59
Terrestrial	Yes	no	Yes	No	0	0	No	No	No	No	0	Yes	No	No	No	2	2	No	0	No	5.80	0.43	Yes	1	8	0.43	12.59
IP	Yes	yes	No	Yes	0	0	No	No	No	No	0	Yes	No	No	No	0	2	No	0	No	5.60	0.47	Yes	1	8	0.47	12.54
IP	Yes	yes	No	Yes	0	0	No	No	No	No	0	Yes	No	No	No	0	2	No	0	No	5.50	0.47	Yes	1	8	0.47	12.38
IP	Yes	yes	No	Yes	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.40	0.48	Yes	1	8	0.48	12.29
IP	Yes	no	Yes	No	0	1	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.63	0.42	Yes	4	8	0.42	12.24
Satellite	Yes	yes	No	No	1	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.80	0.37	Yes	1	6	0.37	12.16

Base Functionality	High Efficiency Video Processing	Full HD	Ultra HD	3D-TV	Additional RF channels	Additional channels IP or Terrestrial	DVR	DOCSIS 2.0 or ADSL	VDSL	DOCSIS 3.0	DOCSIS 3.0 additional 4 channels above 4	In home network	Access point Router	Telephony VOIP	Smart Home Services	MIMO Wi-Fi 2.4GHz	MIMO Wi-Fi 5GHz	Powerline	Community Wi-Fi	Blu-Ray DVD player /recorder	On Power (W)	Standby Power (W)	Does product support APD?	The default time period after which the CSTB switches itself into standby (hrs)?	The max APD time	APD Power (W)	Product Annual Energy Consumption (kWh/year)
IP	No	yes	No	Yes	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.20	0.48	Yes	1	8	0.48	11.96
Satellite	Yes	yes	No	No	1	1	No	No	No	No	0	Yes	No	No	No	2	2	No	1	No	6.50	0.16	Yes	2	6	0.16	11.84
Cable	Yes	no	Yes	No	0	1	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.80	0.32	Yes	1	8	0.32	11.78
Cable	Yes	no	Yes	No	0	2	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.50	0.38	Yes	1	8	0.38	11.71
Cable	Yes	no	Yes	No	0	1	No	No	No	No	0	Yes	No	No	No	0	2	No	0	No	5.25	0.43	Yes	4	8	0.42	11.68
IP	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.42	0.37	Yes	4	8	0.37	11.54
IP	Yes	no	Yes	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.20	0.42	Yes	1	8	0.42	11.51
IP	Yes	no	Yes	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.20	0.42	Yes	1	8	0.42	11.49
IP	Yes	no	Yes	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.20	0.42	Yes	1	8	0.42	11.49
IP	Yes	yes	Yes	Yes	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	4.85	0.48	Yes	1	8	0.48	11.38
Cable	Yes	no	Yes	No	0	1	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.20	0.39	Yes	1	8	0.39	11.34
IP	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.82	0.22	Yes	4	8	0.22	11.13

Base Functionality	High Efficiency Video Processing	Full HD	Ultra HD	3D-TV	Additional RF channels	Additional channels IP or Terrestrial	DVR	DOCSIS 2.0 or ADSL	VDSL	DOCSIS 3.0	DOCSIS 3.0 additional 4 channels above 4	In home network	Access point Router	Telephony VOIP	Smart Home Services	MIMO Wi-Fi 2.4GHz	MIMO Wi-Fi 5GHz	Powerline	Community Wi-Fi	Blu-Ray DVD player /recorder	On Power (W)	Standby Power (W)	Does product support APD?	The default time period after which the CSTB switches itself into standby (hrs)?	The max APD time	APD Power (W)	Product Annual Energy Consumption (kWh/year)
IP	No	no	Yes	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	4.43	0.32	Yes	4	8	1.25	11.08
Satellite	Yes	yes	No	No	1	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.50	0.23	Yes	1	6	0.23	10.67
Satellite	No	no	No	No	0	1	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.44	0.24	Yes	4	8	0.24	10.64
Terrestrial	Yes	no	Yes	No	0	1	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.12	0.31	Yes	2	8	0.31	10.62
Satellite	Yes	yes	No	No	1	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.50	0.21	Yes	1	6	0.21	10.53
Satellite	Yes	yes	No	No	1	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.50	0.21	Yes	1	6	0.21	10.53
Satellite	Yes	yes	No	No	1	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.56	0.18	Yes	1	8	0.18	10.41
IP	Yes	yes	No	Yes	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	4.15	0.50	Yes	4	8	0.50	10.38
IP	Yes	no	Yes	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	4.50	0.38	Yes	1	8	0.38	10.11
IP	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.06	0.25	Yes	4	8	0.25	10.09
Cable	Yes	yes	No	No	1	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.50	0.15	Yes	3	8	0.15	10.09
Satellite	Yes	yes	No	No	1	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	5.50	0.13	Yes	1	6	0.13	9.99

Base Functionality	High Efficiency Video Processing	Full HD	Ultra HD	3D-TV	Additional RF channels	Additional channels IP or Terrestrial	DVR	DOCSIS 2.0 or ADSL	VDSL	DOCSIS 3.0	DOCSIS 3.0 additional 4 channels above 4	In home network	Access point Router	Telephony VOIP	Smart Home Services	MIMO Wi-Fi 2.4GHz	MIMO Wi-Fi 5GHz	Powerline	Community Wi-Fi	Blu-Ray DVD player /recorder	On Power (W)	Standby Power (W)	Does product support APD?	The default time period after which the CSTB switches itself into standby (hrs)?	The max APD time	APD Power (W)	Product Annual Energy Consumption (kWh/year)
IP	No	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	4.65	0.31	Yes	4	8	0.31	9.84
IP	Yes	yes	Yes	Yes	0	0	No	No	No	No	0	Yes	No	No	No	0	2	No	0	No	3.96	0.46	Yes	1	8	0.46	9.78
IP	Yes	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	3.96	0.37	Yes	4	8	0.37	9.14
Cable	Yes	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	4.78	0.12	Yes	1	6	0.12	8.71
Cable	Yes	yes	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	4.78	0.12	Yes	1	6	0.12	8.71
Satellite	No	no	No	No	0	0	No	No	No	No	0	No	No	No	No	0	0	No	0	No	3.87	0.30	Yes	3	8	0.30	8.49
IP	Yes	yes	No	No	0	1	No	No	No	No	0	No	No	No	No	0	0	No	0	No	2.61	0.25	Yes	4	8	0.25	6.07

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