

Date: 26<sup>th</sup> May, 2016

**Schedule No.: 11**  
**Color Televisions**

**1. Scope**

This schedule specifies the energy labeling requirements for color televisions with native resolution upto 1920 X 1080 pixels, of CRT, LCD (with CCFL Backlighting), LCD (with LED Backlighting), Plasma technologies and the television types including TV combination unit being manufactured, imported or sold in India .

This schedule does not cover monitors with computer capability (e.g., a computer input port, such as VGA) that are marketed and sold as computer monitors.

**2. Normative Reference**

- (i) This Schedule shall be read in conjunction with IS 13384:1992 (Part 1 & Part 2) and IS 13900:1993 for CRT's.
- (ii) Products under this Standard shall meet the requirements IS 616:2010/IEC 60065:2005 for safety in order to qualify for the BEE label.

**3. Terms and Definitions**

- (i) **Television (TV):** A commercially available electronic product designed primarily for the display/direct view and reception of audio visual signals from terrestrial, cable, satellite, Internet Protocol TV (IPTV), or other transmission of analog and/or digital signals, consisting of a tuner/receiver and a display encased in a single housing. The product usually relies upon a Cathode Ray Tube (CRT), Liquid Crystal Display (LCD) with Cold Cathode Fluorescent Lamp (CCFL) backlight, and Light Emitting Diode (LED) backlight and Plasma Display.
- (ii) **TV Combination Unit:** A system in which the TV and an additional device(s) (e.g., DVD player, HDD, VCR, etc.) are combined into a single unit; the additional device(s) is inbuilt into the television casing and it is not possible to measure the power requirements of the two (or more) components separately without removal of the television casing; The complete system is connected to the wall outlet with a single power cable.
- (iii) **Analog TV:** The television sets having the provisions of National Television Standards Committee (NTSC), Phase Alternating Line (PAL), or Sequential Color with Memory (SECAM) tuner and may have analog video inputs (e.g., composite video, component video, S-video, RGB).
- (iv) **Digital TV:** Digital televisions include at least one digital tuner or at least one digital video input (e.g., HDMI). Products with an analog tuner and both analog and digital inputs should be considered digital products.
- (v) **External Power Supply:** A Flexible cord, for supply purposes that is fixed to the

appliances and designed to convert line voltage AC input from the mains to lower DC voltage(s) for the purpose of powering the television.

- (vi) **Power Modes:** The consumption of power in the modes mentioned below shall follow the definition of respective clause as mentioned in IEC 62301–Household electrical appliances measurement of standby power.

Power Modes	Definition
Standby power mode	As per clause 3.6 of IEC 62301
Active Mode	As per clause 3.8 of IEC 62301

- (vii) **Disconnected:** As defined in clause 3.9 of IEC 62301 – Household electrical appliances measurement of standby power.
- (viii) **Family of models:** Family of models is the range of models of a particular brand, to which a single set of test reports is applicable and where each of the models has the same relevant physical characteristics, comparative energy consumption, and energy efficiency rating and performance characteristics.  
 Note: The model which does not come under Family of Models shall be considered as a separate model.
- (ix) **Luminance:** The photometric measure of the luminous intensity per unit area of light traveling in a given direction. Luminance describes the amount of light that passes through or is emitted from a particular area, and falls within a given solid angle. The standard unit for luminance is candela per square meter ( $\text{cd}/\text{m}^2$ ).
- (x) **Automatic Brightness Control (ABC):** An integrated control system that automatically adjusts the brightness of a television based upon ambient lighting conditions. A TV with ABC enabled feature will reduce its screen luminance automatically in response to lower ambient lighting conditions. When implemented correctly, this can both reduce energy consumption and improve viewing quality.
- (xi) **Native Resolution:** It can be defined as the physical size of the screen - measured by the amount of pixels.  
 [Example: television with a screen resolution of 1920 x 1080 would have a native vertical resolution of 1080]
- (xii) **Label** means any written, printed, marked, stamped or graphic matter affixed to, or appearing upon, the Color Televisions.
- (xiii) **Validity of Label:** means the validity period of the Annual Energy Consumption standards under energy labeling plan specified in the schedule.

**4. Eligibility Criteria:**

Every color televisions as mentioned in the scope of this schedule and are capable of being powered from either a wall outlet or a battery unit that is sold with an external power supply, shall have the following requirement to qualify for BEE Star label:

1. The televisions shall confirm to the relevant standards as specified in above section (2)
2. The televisions shall meet the standby power consumption requirement of TVs as specified in Table 1:

**Standby power consumption requirement of TVs**

CRT TVs	≤ 1.0 W
LCD (with CCFL backlight)/ Plasma TVs	≤ 0.8 W
LCD (with LED backlight)	≤ 0.6 W

**3. Luminance Requirements:** To qualify for a BEE label, a television’s measured peak luminance in the default, as-shipped picture mode (home mode) shall be greater than or equal to 65% of the measured peak luminance in the brightest selectable preset picture mode (factory or retail picture mode).

**5. Testing Guideline**

5.1 **General :** To qualify as BEE Star labeled product, the Color TV & TV combination unit sets shall meet the eligibility criteria specified in Section 3 and tested as per the test protocol outlined in the below mentioned section 5.2 of this schedule.

5.2 **Test Standards:** Manufacturers are required to perform tests as per the standards mentioned below:

**Test Standards for Measuring Operational Modes**

Test Parameters	Test Standards
Standby	IEC 62301, Ed 2.0: Household Electrical Appliances – Measurement of Standby Power
On Mode	IEC 62087, Ed 3.0: Methods of Measurement for the Power Consumption of Audio, Video and Related Equipment, Section 11, “Measuring conditions of television sets for On (average) mode.”
Picture level adjustments	IEC 62087, Ed 3.0 Methods of Measurement for the Power Consumption of Audio,

	Video and Related Equipment
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**5.3 Test Conditions:**

<b>Supply Voltage:</b>	230 ( $\pm 1\%$ ) Volts AC, 50 Hz ( $\pm 1\%$ ) <b>Note:</b> For products rated for $> 1.5$ kW maximum power, the voltage range is $\pm 5\%$
<b>Total Harmonic Distortion (THD) (Voltage):</b>	$< 2\%$ THD ( $< 5\%$ for products which are rated for $> 1.5$ kW maximum power)
<b>Ambient Temperature:</b>	$23^{\circ}\text{C} \pm 5^{\circ}\text{C}$
<b>Relative Humidity:</b>	10 – 65 %

- 5.4 **Testing at Factory Default Settings:** In measuring the On Mode power consumption, the energy consumption of products shall be measured as they are shipped out from the factory. TV Models need to provide a forced menu at the initial start-up and shall be shipped in the home picture mode. TV models that do not make use of a forced menu at initial start-up, and are shipped in a “retail” or equivalent mode, must be tested in that “retail” mode for qualification. Picture level adjustments that need to be made prior to testing On Mode power consumption should be made per section 11.4.8, “Picture level adjustments, of IEC 62087 Edition 3.0, if applicable.
- 5.5 **Measuring Instruments:** Measuring instruments shall have the attributes as given in IEC 62301 Edition 2.0: Household Electrical Appliances – Measurement of Standby Power, and Section 5 – General Method of Measurement of IEC 62087 Edition 3.0: Methods of measurement for the power consumption of audio, video and related equipment.
- 5.6 **Accuracy in measurements:** Measurements of power of 0.5 W or greater shall be made with a relative uncertainty of less than or equal to 2% at the 95% confidence level. Measurements of power of less than 0.5 W shall be made with an uncertainty of less than or equal to 0.01 W at the 95% confidence level.
- 5.7 **Requirement for TVs with ‘Automated Brightness Control’ (ABC):** ABC functionality shall be disabled before testing of TVs with ABC sensors and this feature shall not be taken into account during measurement of power consumption. The test shall be performed while the TV is in the home viewing mode.
- 5.8 **Annual Energy Consumption:** Annual Energy consumption of the product shall be calculated using the following equation.

$$\text{AEC} = (6 \times \text{Pa} + 12 \times \text{Ps}) \times 0.365 \text{ kWh/Year}$$

Where:

Pa: On Mode power consumption in Watts

Ps: Standby Mode power consumption in Watts

NOTE: This annual energy consumption is estimated based on a daily usage pattern of 6 hours in 'On' Mode and 12 hours in 'Standby' Mode.

**Note:** For remaining 6 hours, device is considered as 'Switched Off'.

## 5. Energy Labeling Plan:

To qualify for BEE Star labeled product, all TVs and TV Combination Units shall not exceed maximum Annual Energy Consumption (AEC max) derived from the equations in Table 2.1 based on the unit's native vertical resolution and visible screen area. The maximum annual energy consumption is expressed in kilo watt hours per year (kWh/year). The value reported shall be are rounded off to the nearest whole number as per IS 2:1960 reaffirmed 2000, Edition 2.3.

The Star Rating Equations are derived by the following equation:

$$\mathbf{E} = (\mathbf{X} \times \mathbf{A}) + \mathbf{Y}$$

Where:

- E (in kWh/year) = Annual Energy consumption
- A (in square inches) = the effective/viewable screen area calculated by multiplying the display/screen width by the display/screen height
- X (in kWh/year) = ON Mode power consumption in (W/sq.inch) x hours of operation in 'On Mode' x 365/1000
- Y (in kWh/year) = Standby Mode power consumption in W x hours of operation in 'Standby Mode' x 365/1000

This annual energy consumption estimate is based on a daily usage pattern of 6 hours in 'On' Mode and 12 hours in 'Standby' Mode.

As given in Table 2.1, 'A' is the effective/viewable screen area (square inches or square centimeters), derived by multiplying the display/screen width by the display/screen height.

Typical example of maximum annual Energy consumption for TVs of preferred screen sizes is provided for illustration. The maximum annual energy consumption values will remain

unchanged whether the screen area is measured in square inches or square centimeters.

**This schedule applies to all the screen sizes of televisions and not limited to the preferred screen size mentioned in the examples.**

**Table 2.1: Star rating equations for Televisions (from January 01, 2016 to December 31, 2017)**

A (in square inches)	1 – Star	2 – Star	3 – Star	4 – Star	5 – Star
<b>CRT</b>	$E = (0.578 \times A) + 4.38$	$E = (0.526 \times A) + 4.38$	$E = (0.473 \times A) + 4.38$	$E = (0.421 \times A) + 4.38$	$E = (0.368 \times A) + 4.38$
<b>LCD (with CCFL backlight) / Plasma</b>	$E = (0.386 \times A) + 3.50$	$E = (0.350 \times A) + 3.50$	$E = (0.315 \times A) + 3.50$	$E = (0.280 \times A) + 3.50$	$E = (0.245 \times A) + 3.50$
<b>LCD (with LED backlight)</b>	$E = (0.193 \times A) + 2.63$	$E = (0.175 \times A) + 2.63$	$E = (0.158 \times A) + 2.63$	$E = (0.140 \times A) + 2.63$	$E = (0.123 \times A) + 2.63$
A (in square cms)	1 – Star	2 – Star	3 – Star	4 – Star	5 – Star
<b>CRT</b>	$E = (0.090 \times A) + 4.38$	$E = (0.081 \times A) + 4.38$	$E = (0.073 \times A) + 4.38$	$E = (0.065 \times A) + 4.38$	$E = (0.057 \times A) + 4.38$
<b>LCD (with CCFL backlight) / Plasma</b>	$E = (0.060 \times A) + 3.50$	$E = (0.054 \times A) + 3.50$	$E = (0.049 \times A) + 3.50$	$E = (0.043 \times A) + 3.50$	$E = (0.038 \times A) + 3.50$
<b>LCD (with LED backlight)</b>	$E = (0.030 \times A) + 2.63$	$E = (0.027 \times A) + 2.63$	$E = (0.024 \times A) + 2.63$	$E = (0.022 \times A) + 2.63$	$E = (0.019 \times A) + 2.63$

**Table 2.1.1: Star wise Annual Energy consumption for CRT TV's for preferred Screen Sizes (from January 01, 2016 to December 31, 2017)**

Screen Size (inches)	Screen Area* (sq inches)	Maximum Annual Energy Consumption in kWh/Year				
		1 – Star	2 – Star	3 – Star	4 – Star	5 – Star
	A	$E = (0.578 \times A) + 4.38$	$E = (0.526 \times A) + 4.38$	$E = (0.473 \times A) + 4.38$	$E = (0.421 \times A) + 4.38$	$E = (0.368 \times A) + 4.38$
14	94.1	59	54	49	44	39
21	211.7	127	116	104	93	82
29	403.7	238	217	195	174	153
32	491.5	289	263	237	211	185

\* Aspect Ratio for CRT considered in the example is 4:3

**Table 2.1.2: Star wise Annual Energy consumption for LCD (with CCFL backlight) and Plasma TV's for preferred Screen Sizes (from January 01, 2016 to December 31, 2017)**

Screen Size (inches)	Screen Area* (sq inches)	Maximum Annual Energy Consumption in kWh/Year				
		1 – Star	2 – Star	3 – Star	4 – Star	5 – Star
		$E = (0.386 \times A) + 3.50$	$E = (0.350 \times A) + 3.50$	$E = (0.315 \times A) + 3.50$	$E = (0.280 \times A) + 3.50$	$E = (0.245 \times A) + 3.50$
20	170.9	69	63	57	51	45
26	288.9	115	105	95	85	74
32	437.6	172	157	141	126	111
37	585.0	229	208	188	168	147
42	753.8	294	268	241	215	188
46	904.2	352	320	289	257	225
50	1068.2	415	378	340	303	265
55	1292.6	502	456	411	366	320

\*Aspect Ratio considered in the example is 16:9

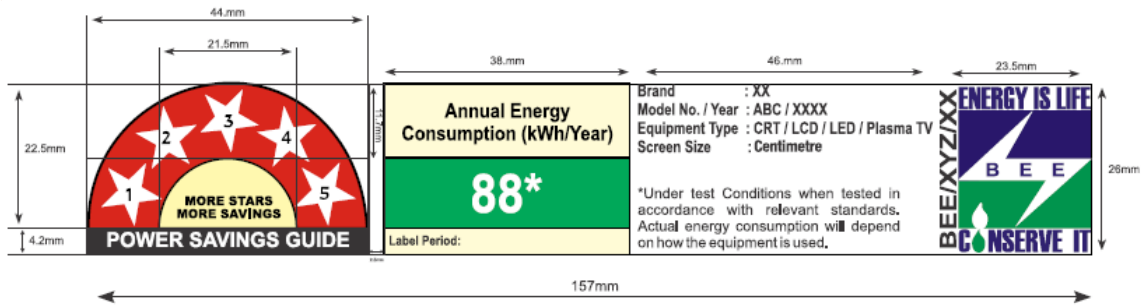
**Table 2.1.3: Star wise Annual Energy consumption for LED TVs (with LED backlight) for preferred Screen Sizes (from January 01, 2016 to December 31, 2017)**

Screen Size (inches)	Screen Area (sq inches)	Maximum Annual Energy Consumption in kWh/Year				
		1 – Star	2 – Star	3 – Star	4 – Star	5 – Star
		$E = (0.193 \times A) + 2.63$	$E = (0.175 \times A) + 2.63$	$E = (0.158 \times A) + 2.63$	$E = (0.140 \times A) + 2.63$	$E = (0.123 \times A) + 2.63$
20	170.9	36	33	30	27	24
26	288.9	58	53	48	43	38
32	437.6	87	79	72	64	56
37	585.0	115	105	95	85	74
42	753.8	148	135	121	108	95
46	904.2	177	161	145	129	113
50	1068.2	209	190	171	152	134
55	1292.6	252	229	206	184	161

\*Aspect Ratio considered in the example is 16:9

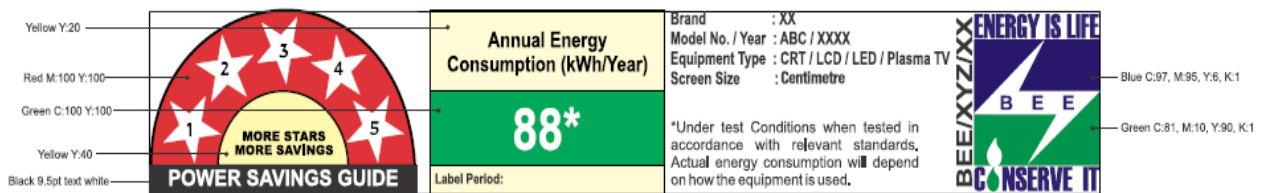
## 7. Manner of Display

- (i) **Details of particulars to be displayed on label of Color Televisions.**
  - (a) **Label design, size, color scheme, and content of the label**
    - (i) The design & dimension of the label is given below:



CDR file is available on the S&L web portal

(ii) The color scheme of the energy label is as follows



**(b) Color Scheme for BEE Logo**

**BLUE –**

Hue (H)-239° Saturation(S):64% Brightness (B):59%

Luminance or lightness (L):28, chromatic components -a: 24 b: 54

Red(R):54 Green (G):55 Blue (B):151

Cyan(C):97% Magenta (M):95% Yellow(Y):6% Black (K):1%

Web color code - #363797

**GREEN –**

Hue (H)-150° Saturation(S):10% Brightness (B):67%

Luminance or lightness (L):61, chromatic components -a: 53 b: 32

Red(R):0 Green (G):170 Blue (B):87

Cyan(C):81% Magenta (M):10% Yellow(Y):90% Black (K):1%

Web color code - #00AA56

**(c) Material, Shape & Placement:**

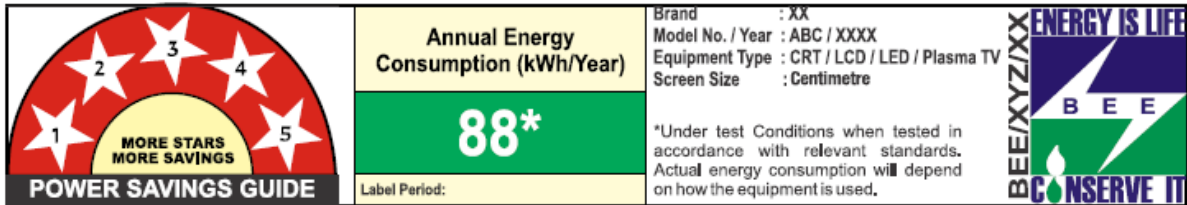
The label shall be self –adhesive or non-sticky level pop up type or attached as swing tag and shall be designed as specified in above section 7 (i)(a). All television must display the label at the point of sale. The label shall be,

1. Either Non-sticky level pop type or it may be attached as a swing tag (Durable



- cardboard ) on the front side, and
2. Self –adhesive affixed on the back side, and
3. Self –adhesive affixed on the carton box.

(d) Sample Label :



8. Fees

- (i) Application fee payable on application for authority to affix labels is INR 2000/- (Rupees one thousand only).
- (ii) Application fee payable on application for renewal of authority to affix labels is INR 1000/- (Rupees five hundred only).
- (iii) Labelling fee for affixation of label on each piece of color television is INR 10/- (Rupees ten only).

9. Others

- (i) **Tolerance limits:** There shall be **no tolerance** for the Star Rating. All tested products shall meet the minimum threshold limits for each Star Rating Band.
- (ii) **User Information Requirement:** In order to ensure that consumers are properly informed of the benefits of keeping their TVs in the default modes as shipped, particularly for those models that incorporate additional features and functionality that, if employed, would result in increased energy use beyond that intended by the BEE Star Label requirements for On and Standby, the manufacturer shall include with each TV the necessary information on BEE Star label and the benefits of keeping the TV at its factory default settings that meet star labeling criteria, in either a hard copy or electronic copy of the user manual. Where necessary, manufacturers shall also include language advising consumers that enabling certain additional features and functionality in their TV shall increase its energy consumption, possibly beyond the limits required for Star label qualification. Therefore the following information shall be distinctly appear in the manual in the form of ‘ATTENTION’ at the beginning of the user manual.

**ATTENTION:**

This product is qualified for the BEE Star rating in the 'Home' Mode. The Objectives of Star Labeling Program is designed to promote energy efficient products and practices. When the television is initially set up, it is designed to meet the BEE Star Labeling requirements while maintaining optimum picture quality.

- Changes to certain functionalities of this television (TV Guide, Picture/sound etc) may change the power consumption.
- Depending upon such changed setting (eg., Retail mode), the power consumption may vary which possibly could exceed the stated energy consumption.

To reset the television to Star rating qualified settings, select 'Home' mode from the initial set-up procedure in 'factory settings' under the 'Set-up' menu.

**Note:**

1. IS 616:2010 specifies safety requirements for all sizes of TV. Therefore to qualify for BEE label, all sizes of TV are to be tested and shall have to meet the safety requirements as mentioned in IS 616:2010.