LGE comments on
EPA Energy Star TV 3.1 Draft (EPA V3.1)

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LG Electronics

April 29, 2009

2. LGE Comment Summary

EPA V3.1 Draft	LGE comment*1	Summary	
● **On-mode limit is too tight.** **- Compared with V 3.0, V3.1 is two times tighter than V3.0**	✓not attractive to manufacturers. + consumers have to spend more money. = Manufacturer will not attach Energy star logo to their products and consumers will disregard Energy star products.	➢ Power consumption/ Efficiency Trend (long chance to acquire Energy star mark)	Annex1 Annex2
	✓ Only LED BLU will meet V3.1 but more CO2 emission, higher purchase price ➔ 80% of V3.0 limit is Reasonable		Annex3
● **Peak Luminance introduction** **- Home luminance is 80% more than shop luminance** (MEPS:50%,EuP:65%)	✓ EPA has to focus on power consumption, not luminance. ✓consumer can't watch TV in an Optimized picture quality. ➔Withdraw peak luminance limit or change from 80 to 50%.	➢ TV has an optimized picture condition according to ambient light level. ➢ Retail mode ≠ consumer-optimized condition should check energy star satisfaction only at home mode.	Annex4 Annex5
● **Automatic brightness control** (power consumption is 20% less than shop mode's)	✓ keep up or stimulate it. ➔ At least keep up the current spec.	➢ Intelligent Sensor supplies an optimized picture without eye fatigue to consumer and power saving.	

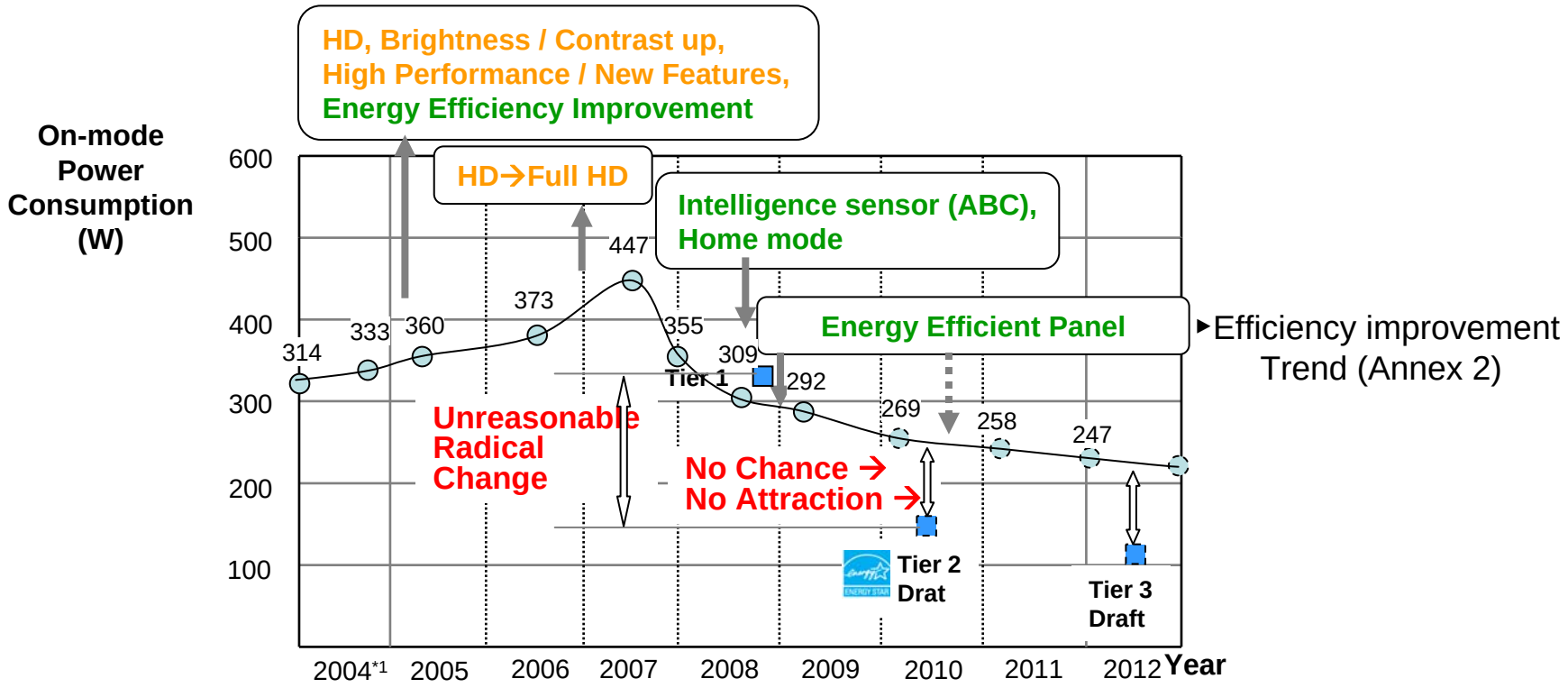
* Agree with Panasonic opinions except above LGE comments

Annex 1. Long chance to be certificated V3.1

It's a long chance to meet V3.1 from an economic and technical point of view.
It's not attractive to consumer due to high cost.
LG requests to reduce V3.1's limit level to 80% of V3.0 spec.
Industry endeavors to improve customer value and reduce power consumption
Price will increase a lot to meet V3.1 (refer to Annex 4)

Trends of On-mode Power Consumption

(50V Plasma Television, LGE)



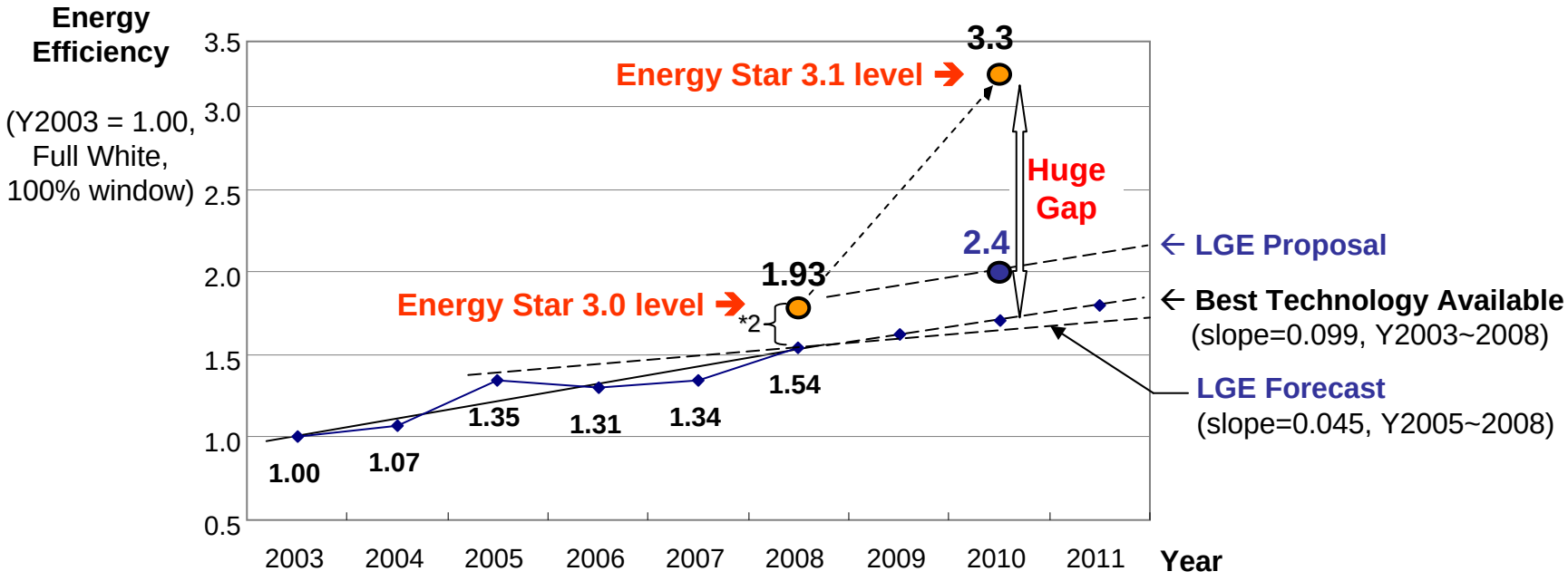
*1. Power Estimation (Y2004~2007)
: Conversion to on-mode power of the IEC62087 ed2.0 Broadcasting contents

Annex 2. Efficiency improvement Trend

New technology is being developed and energy efficiency improvement is about 5% every year.
It's a long chance to meet Radical change requirement.
Year 2008's Energy Efficiency has improved 1.5 times than year 2009's
(* Reference : Annual improvement is about 9.9%)
energy efficiency improvement expects to be about 4.5% up every year.

Trends of Display Energy Efficiency

(42V HD module, LGE)



*1. ref.) EuP : 20% will be tighter every two years.
2. adapts Automatic Brightness Control (20% improvement) and acquire Energy Star mark.

Annex 3. disadvantage : alternative device – LED

- **LED BLU TV's market share is very low and almost all TVs don't meet EPA V3.1**
  As a result, industry doesn't pay attention to Energy star and Energy star will be not popular.
  LED BLU consumes more power than CCFL and emits more CO2 than CCFL.

LED TV's disadvantage

✓ **Higher CO2 Emission in the production process**
(BLU for 52V LCD TV)

BLU type	Quantity Required (pcs)	Corresponding Power Consumption (kWh)	CO2 Emissions (kg)
CCFL	24	13.4	5.5
LED (RGB)	4,500	552.0	226.3

→ **Additional CO2 emission(power consumption):**
2.45 years in BLU production
(219kwh per annual
= power 164W(tier2 limit), 1460hr per annual.
(0.41kg-CO2/kwh)

Source) Japan Business Council in Europe
http://rohs.exemptions.oeko.info/fileadmin/user_upload/Stakeholder_comments/Exemption-4_JBCE_1_April_2008_01.pdf

✓ **LED TV, Slow penetration in TV**

Year	2009	2010	2011	2012	2013
LED BLU Market Penetration for TV (%)	1.8	4.8	8.7	9.4	10.1

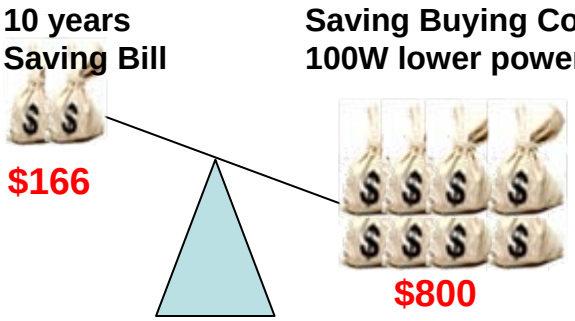
Source) DisplaySearch, Backlight Lamps and Backlight Units Report (July 2008)
http://www.displaysearch.com/files/

CCFL: Cold cathode fluorescent lamps
LED: light emitting diode, BLU: backlight unit

Annex 3. disadvantage : alternative device – LED

V3.1 is too tight and only LED BLU TVs can meet V3.1.
customers tends to get Energy star qualified products but V3.1 has disadvantage of purchase.
current technology increases production cost and customers have to pay for more money.

✓ High Cost = High Price = big customer burden



*1. electricity rates savings at purchasing lower power consumption products

Annual electriciy rates 300W FPD TV = $ 49.71

0.3kW * 1,460hr = 438kWh,
438kWh * ¢ 11.35/kWh = ¢ 4971 (4hrs/day, 1,460hrs/year)

Annual electriciy rates savings = ¢ 16.57

0.001kW * 1,460hr = 1.46kWh, 1.46kWh * ¢ 11.35/kWh = ¢ 16.57

300W → 200W(saves 100W) : 10 year electriciy rates savings = $165.70

*2. consumer's purchasing price of lower power consumption products

LCD HDTV	TV price by BLU type		Remarks
	CCFL	LED	
46V 1080p	$1349~1899	$2699	$800~1350 up
55V 1080p	$2799	$3499	$700 up

Source) http://www.bestbuy.com/ Apr 17, 2009

[Table] Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, by State, Year-to-Date through December 2008 and 2007
(Cents per kilowatthour, Released: March 24, 2009**)**

Census Division and State	Residential		All Sectors	
	2008	2007	2008	2007
New England	17.57	16.7	15.84	15.08
Middle Atlantic	15.15	13.95	13.38	12.31
East North Central	10.46	9.74	8.59	7.97
West North Central	8.73	8.31	7.17	6.83
South Atlantic	10.74	10.03	9.4	8.68
East South Central	9.27	8.35	7.82	7.01
West South Central	11.76	11.15	10.09	9.27
Mountain	9.84	9.31	8.16	7.69
…				
U.S. Total	**11.35**	10.65	9.81	9.13

Source) http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_b.html

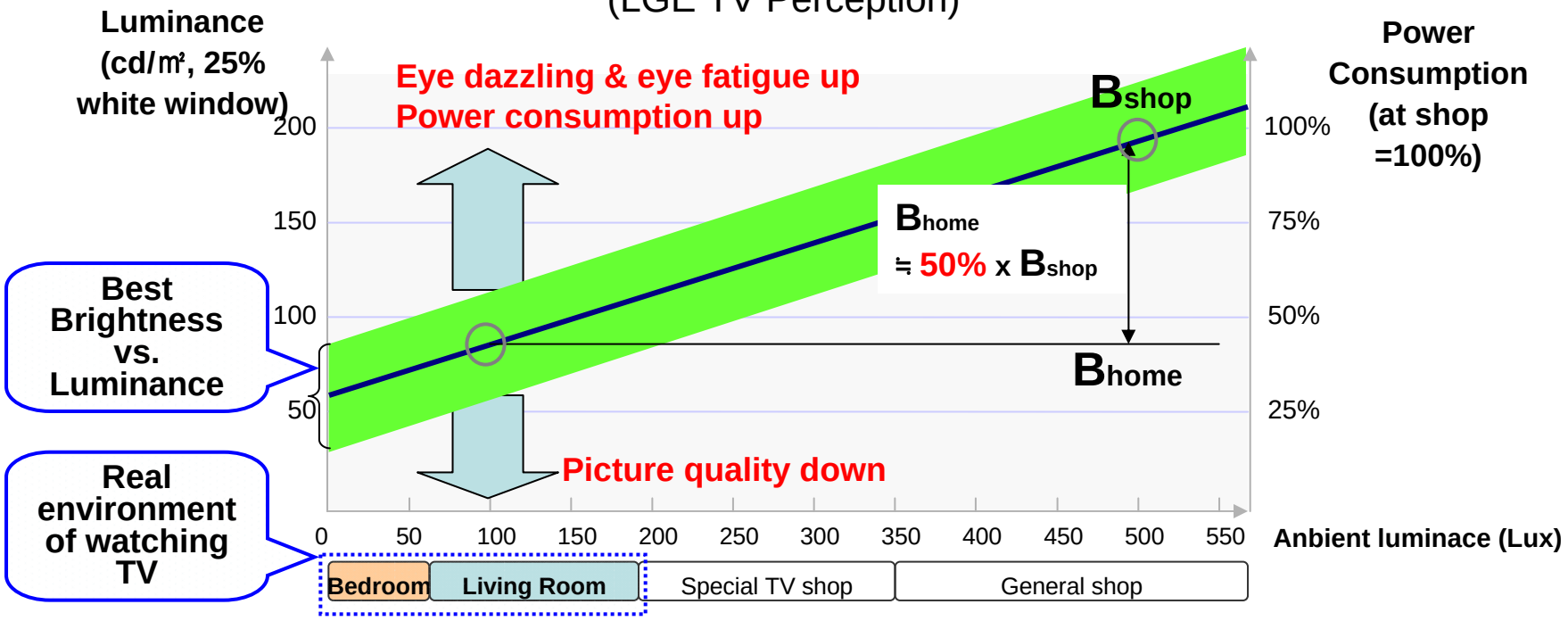
Energy Information Administration
Official Energy Statistics from the U.S. Government

Annex 4. Optimized watching environment

An optimized watching condition exists according to ambient luminance.
Limiting Peak luminance ratio to 80% is losing chance to watch TV in an optimized picture quality and save power consumption.
If you want to limit the peak luminance ratio , 50% limit is reasonable.
An optimized watching condition in home and shop environment is different and Home mode's optimized brightness is relatively low.
There is no case to claim low home mode's brightness.
It's consumer's duty to judge suitable brightness condition.
If you need to peak luminance ration, you have to harmonize energy star regulation with other power consumption regulations (EuP*1 : 65%, MEPS*2 : 50%)

Best Viewing Brightness vs. Ambient Luminance

(LGE TV Perception)



[TV real watching environment] average. 100 Lux (50~250 Lux) Source) Nikkei BP FPD2006 Strategy

*1. EU peak luminance ratio within eco design requirements for TVs, 2. Australia Greenhouse Office proposal