
Procedure for DAM Testing: For TVs

Revision 0.2
30 April 2010

Page 1 of 7

1 SCOPE

This is CEA's Hospitality's method for acceptance testing of Download Acquisition Mode (DAM) Power usage (E_DAM) for Version 4.1 / 5.1 of the Energy Star Program Requirements specification, for Televisions using a DAM mode to update items including, but not limited to, EPGs, TV Setup Data (TV Cloning), Channel Map updates, and TV firmware updates. This method is applicable to any TV using the DAM mode for these types of updates.

Note: This test procedure is intended to test the DAM energy use for hospitality televisions, as defined in ENERGY STAR Version 4.1 for televisions. Only televisions that meet the Version 4.1 definition for hospitality televisions may use this test procedure to satisfy DAM qualification requirements for the ENERGY STAR program. Hospitality televisions are defined as: *A television with a control port for bi-directional communication (DB-9, RJ11, RJ12, RJ45, coaxial cable, or HDMI-CEC) AND activated hospitality protocol software (SmartPort, MPI, MTI, Serial Protocol, or similar control) for the purpose of direct access to Video-On-Demand, (VOD) systems or a digital media player designed for hospitality-specific applications.* All other televisions with a DAM mode must qualify using the existing ROVI DAM test protocol. This test procedure will expire on June 28, 2010. Over the next two months, EPA will work with stakeholders to finalize a test procedure and integrate it into the ENERGY STAR Television specification. Absent an approved test protocol, hospitality televisions that use an EPG other than the ROVI EPG will not be eligible for ENERGY STAR qualification beginning on June 28, 2010.

2 TABLE OF CONTENTS

	Page
1 SCOPE.....	1
2 TABLE OF CONTENTS.....	1
3 REFERENCE DOCS:.....	2
4 DEFINITION OF DAM MODE:	2
5 QUALIFICATIONS TO THE DAM MODE POWER USAGE	2
6 DAM MODE POWER MEASUREMENT.....	3
6.1.1 Ideal.....	3
6.1.2 Practical.....	3
6.1.3 Verification	4
7 CONNECTION DIAGRAM	4
8 TEMPLATES.....	5
8.1 Blank DAM Declaration Template.....	5
8.2 Example DAM Declaration Template.....	6

Procedure for DAM Testing: For TVs

Revision 0.2
30 April 2010

Page 2 of 7

9 REVISION HISTORYERROR! BOOKMARK NOT DEFINED.

3 REFERENCE DOCUMENTS

1. Energy Star TV Program Requirements – Procedure for DAM Testing
2. ENERGY STAR® Program Requirements for Televisions Eligibility Criteria Versions 4.1 and 5.1

4 Definition of DAM mode

In Energy Star 4.1, the EPA defines DAM mode as:

Download Acquisition Mode (DAM): Where the product is connected to a mains power source, is not producing a sound or a picture, and is actively downloading channel listing information according to a defined schedule for use by the electronic programming guide, monitoring for emergency messaging/communications and/or otherwise communicating through a network protocol. The power use in this mode is typically greater than the power requirement in Sleep and less than that in On Mode.

For this document we will modify this definition to include:

*Download Acquisition Mode (DAM): Where the product is connected to a mains power source, is not producing a sound or a picture, and is actively downloading **data, to include, but not limited to,** channel listing information according to a defined schedule for use by the electronic programming guide, **TV setup data/ channel map updates/ TV firmware updates,** monitoring for emergency messaging/communications and/or otherwise communicating through a network protocol. The power use in this mode is typically greater than the power requirement in Sleep and less than that in On Mode.*

5 Qualifications to the DAM mode power usage

- 5.1 We must also consider that there are both frequent downloads and infrequent downloads. We will exclude infrequent downloads; defining infrequent downloads as those that happen no more than four times per year and have a duration of less than six hours per instance. (so < 24 hours/year or < 0.27%) Some examples of infrequent downloads are TV firmware updates (with a duration of <6 hours,) TV setup data downloads, and the Rovi EPG Setup State (which is excluded in the Rovi test procedure.) All others are considered frequent downloads and must be included in the DAM mode power measurement. Note: All DAM functionalities, both frequent and infrequent must be declared, but those meeting the definition of infrequent can be excluded from the measurement procedure. (This declaration is so that the EPA is made aware of, and thereby has the option to evaluate the validity of, and test for the occurrences of, those downloads defined as infrequent.)
 - 5.2 There are also various triggers for the initiation of a DAM sequence. It may be a daily trigger at a certain time of day (as an EPG download), or a TV power state trigger (as a clock update that is performed each time the TV “turned off” before it
-

actually enters Sleep mode.) There are also other asynchronous external triggers possible. Daily triggers need no further discussion, a TV power state trigger will be assumed to happen five times per day. Asynchronous triggers must be estimated in good faith, conservatively towards the high side of expected occurrence. (Significant underestimation is clearly grounds for de-listing.)

- 5.2.1 Some TVs may not instantly go to Sleep mode when turned off but remain in a higher power consuming “active standby” mode for a very short time to facilitate an instant on in case the power off was accidental. This will be excluded from DAM mode power measurement as long as the TV goes into Sleep mode within two minutes of being turned off by the user. (This time duration must be declared if applicable.) If this time exceeds two minutes, then it must also be included in the DAM mode measurements (x 5).
- 5.2.2. Downloads that happen at a frequency of less than once per day, but do not meet the definition of infrequent, must be averaged to come up with an equivalent daily value for the DAM measurement.

6 DAM mode power measurement

6.1 Ideal

- 6.1.1 To ideally measure the DAM mode power consumption, the TV should be connected to power meter that measures the total energy consumed (E_TOTAL) and a signal source that can provide a signal containing the same type and amount or duration of data that the TV will acquire in its actual application DAM use. Then the TV's energy consumption should be measured over a 24 hour period, during which the TV is:

turned on for 1 hour, and then off for 1.5 hours - x 4 times, then turned on for 1 hour followed by off for 13 hours,

logging the time spent in On mode, Sleep mode, and DAM mode. The intermediate off times may be adjusted to allow sufficient time for any power state triggered DAM to complete, and the beginning of the long off time must be timed to allow sufficient time for any daily time triggered DAM to complete. The E_DAM can then be calculated;

$$E_DAM = E_TOTAL - (P_ON * 5 \text{ HRS}) - ((P_SLEEP * (19 \text{ hrs} - \text{Time_DAM hrs}))$$

6.2 Practical

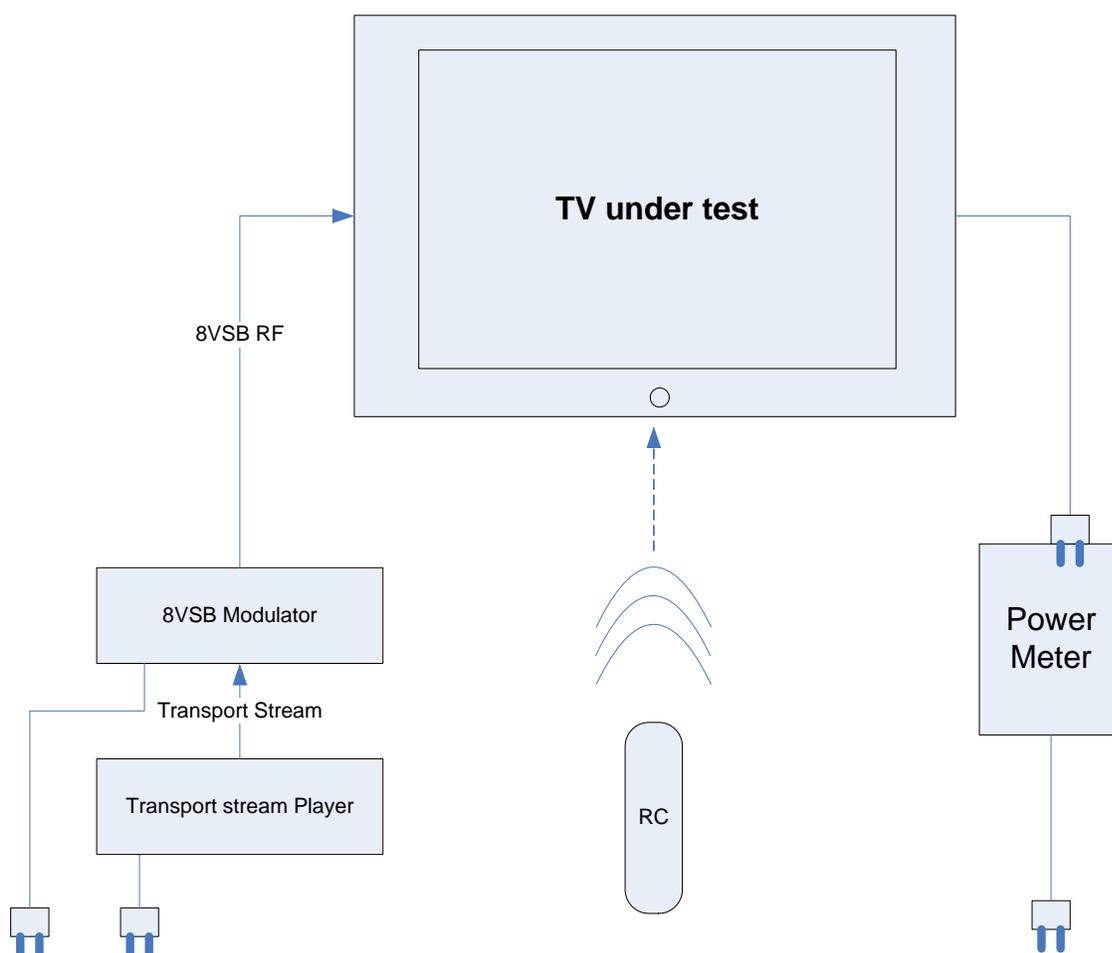
- 6.2.1 For practical measurement of DAM mode power consumption, it can be verified that the E_DAM can be calculated by simply multiplying the
-

instantaneous P_{DAM} by the time in DAM mode. This eliminates the logistical requirements for shipping extremely large transport stream files.

6.3 Verification

6.3.1 The average time per day spent in DAM mode is easily estimated and easily verified by connecting the TV into its intended application and monitoring the energy usage. It is self evident when the TV is in On mode. When the TV is off and drawing less than 1W it must be in Sleep mode, and when it is off and drawing more than 1W, it must be in DAM mode. The verification should be repeated for several days in case a less frequent download occurs on one day.

7 Connection Diagram



Procedure for DAM Testing: For TVs

Revision 0.2
30 April 2010

Page 5 of 7

8 Templates

8.1 Blank DAM Declaration Template

DAM Declarations						Average DAM	Measurable	E_DAM	
Function	Trigger	Duration(s)	Frequency	Estimate		Power(w)	Hrs:Min	(w-hrs)	Notes
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
	Time between Turn-off and enter sleep mode	Time	Applicable to DAM**						
					Total		0:00	0	
									* measurable per section 5.1
									** per section 5.2.1

Procedure for DAM Testing: For TVs

Revision 0.2
30 April 2010

Page 6 of 7

8.2 Example DAM Declaration Template

DAM Declarations						Average DAM	Measurable Time*	E_DAM	
	Function	Trigger	Duration(s)	Frequency	Estimate	Power(w)	Hrs:Min	(w-hrs)	Notes
1	Firmware Update	availability detected by Check	1 hr 45 min	Infrequent	2x / year	26			only if required for feature update/fix
2	Download Setup data	new installation	5 min	Infrequent	Once - initial setup	26			
3	Update Setup/Channel Map	availability detected by Check	5 min	Infrequent	2x / year	26			if new channels added or room setup change required
4	Check for new version of 1,2, or 3	Turn off + 15 min	3 min		5x /day	26	0:15	6.5	Check for new version - downloads only if new version available
5	Initialize EPG setup	new installation	3 hrs	Infrequent	Once - initial setup	26			
6	Update EPG data	daily	15 min	4x /day		26	2:22	62.4	
			2 hrs			26			
			5 min			26			
			2 min			26			
7	Weekly download		1 hr	1x / week		26	0:09	3.9	(60 min / 7 days - rounded to the nearest minute)
8									
9									
10									
	Time between Turn-off and enter sleep mode		Time	Applicable to DAM**					
			15 sec	No					
					Total		2:46	72.8	
									* measurable per section 5.1
									** per section 5.2.1

**Procedure for DAM Testing:
For TVs**

Revision 0.2
30 April 2010

Page 7 of 7
