

INVENTION DISCLOSURE

1. Invention Title.

Set-top energy reduction through DSG one-way mode

2. Invention Summary.

Set-tops systems are designed with an underlying assumption that the set-top is always actively listening to the network. A consideration in reducing set-top energy consumption is devising a means by which the set-top can maintain this one-way, receive-only, level of network connectivity at the lowest level of energy consumption. The DOCSIS Set-top Gateway (DSG) defines a one-way mode of operation in which the up-stream transmitter is disabled and the set-top remains tuned to and listens to the DOCSIS downstream channel.

3. Invention Description.

a. Describe the invention in detail.

In this invention, the DSG embedded Cable Modem (eCM) would transition into one-way mode under application control (rather than under the exclusive direction of the CableCARD). In this one-way mode of operation it shuts down all upstream functionality, and becomes de-registered from the Cable Modem Termination System (CMTS). It maintains its downstream DSG channel connection and continues to forward DSG tunnel packets to the STB. Certain tunnel packets could instruct the STB to transition the eCM back into two-way mode of operation. Similarly the STB could locally determine that it wanted to re-enter two-way mode. No DSG protocol changes are needed here. This could probably be implemented with existing silicon. More optimized silicon solutions could also be envisioned going forward.

DSG defines two separate modes in which the upstream transmitter is disabled: One-way mode, and Two-way Operation Disabled.

- One-way mode is entered by the CM because of a problem encountered in the upstream, which it then signals to the Client Controller;
- Two-way Operation Disabled is when the Client Controller sends a notice to the DSG eCM to shut down an upstream transmitter.

In this invention the Two-way Operation Disabled Mode is used. At present the DSG specification does not specify a message from the headend to the STB to trigger the Client Controller to send this message to the DSG eCM, although it does have the advantage that the Client Controller in the STB can turn the eCM's upstream transmitter(s) on and off as it sees fit to reduce energy consumption. When called to wake up the eCM goes back to acquiring the upstream, and no re-initialization of the eCM is required.

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b. Why was the invention developed? What problem(s) does the invention solve? How is it better?

This invention was developed in determining what approaches could be used to reduce energy consumption of a set-top box in a sleep mode of operation. Upstream transmission consumes set-top energy and is not necessary in sleep modes.

c. Briefly outline the potential commercial value and customers of the invention.

The commercial value is to reduce set-top energy consumption for the benefit of consumers.

4. How is this invention different from existing products, processes, systems?

This invention makes use of existing specifications to introduce energy savings, in particular the CableLabs DOCSIS Set-top Gateway (DSG) Specification, “**DOCSIS Set-top Gateway (DSG) Interface Specification, CM-SP-DSG-I18-110623**”

<http://www.cablelabs.com/specifications/CM-SP-DSG-I18-110623.pdf>. This reduces the need for new specifications to achieve these energy savings.