Silicondust – we make the HDHomeRun PRIME CableCARD products (CableCARD host).

Customers on Long Island with Optimum/Altice cable are seeing problems where video corrupts or stops playing. The problem is caused by the PMT table changing (twice?) every 10-20 minutes and the handling of that change.

The problem was first reported by HDHomeRun and TiVo customers in August 2020.

Technical details of the problem:

The PMT table bounces back and forth between two versions where the difference is the inclusion or exclusion of a 3rd elementary stream with stream type 0x86. This is not a known audio or video stream type. There are no descriptors for this ES (no ECM PID specified). Each new PMT has a correctly incremented sequence number.

When the host detects the PMT change it sends a ca_pmt APDU to the card with the new PMT information as required by the CableLabs CCIF specification. The HDHomeRun sends the ca_pmt APDU with cmd set to ok_descrambling. The card sends a card_cci_challenge followed by a cci_delivery_message. The customer typically sees corrupt audio/video during this process. The channel observed by Silicondust during testing returned CCI 0 and the stream was released in the clear to the host. Given there is no card-to-host encryption involved, the observed audio/video corruption suggests the card itself stopped decryption during this process.

Each ca_pmt APDU contains the same ECM PID information:
- No ECM PID at the program level (no change)
- Specified ECM PID for video (no change)
- Specified ECM PID for audio (no change)

However if the PMT specifies the unknown third ES the ca_pmt APDU includes an entry for this ES with the ECM PID field set to 0. This follows the CableLabs CCIF specification.

HDHomeRun firmware 20200907 includes a 2-part workaround to avoid the problem:

1) If an ES entry is found with stream type 0x86 (unknown, not audio or video) AND if there are no descriptors for this ES (no ECM PID) the HDHomeRun will skip adding this ES entry to the ca_pmt() APDU. By not including this ES entry the PMT change doesn't result a change to the ca_pmt() APDU content.

2) The HDHomeRun will skip sending a ca_pmt() APDU if the PMT change does not result in a change to the ca_pmt() APDU content.

The result of this workaround - the addition or loss of the unknown third ES doesn't result in a ca_pmt() APDU being sent to the card, thus card doesn't stop and restart decryption, thus the customer's viewing experience isn't interrupted.

Note that this workaround is non-compliant with the CableLabs CCIF specification as the workaround relies on the host not informing the card of an ES published in the PMT.

The problem continues to affect TiVo customers.

Optimum/Altice – If I can help with further information or to set up a technical call please email support@silicondust.com or reach out to CableLabs for my contact information.

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