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August 1, 2025

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
45 L Street, NE
Washington, D.C. 20054

Re: Authorizing the Permissive Use of the "Next Generation" Broadcast Television Standard (GN Docket No. 16-142)

Dear Ms. Dortch,

On July 31, Nicholas Kelsey and Ahavah Misrah of Silicondust USA, Inc. met with Erin Boone, Hillary DeNigro, Mark Colombo, Lyle Elder, Maria Mullarkey, Evan Morris, Evan Baranoff, and Benjamin Arden to discuss ATSC 3.0 DRM protection as it relates to ATSC 3.0 video gateway devices.

Nicholas Kelsey is an engineer and the founder of Silicondust USA Inc. He has a BE in Electronic and Computer Engineering, and has extensive experience in network security and DRM.

At the meeting we explained that the goal was to discuss the DRM problem as it relates to ATSC 3.0 video gateway devices, and to present two possible solutions.

The following covers the discussion and provides additional detail:

First it should be noted that Silicondust is not the voice of HDHomeRun customers or the many people who filed Docket 16-142 comments against the use of DRM on public airwaves. When Pearl TV members began encrypting stations, people organized their own effort to bring this matter to the FCC's attention.

Silicondust supports ATSC 3.0 and the ATSC organization. The ATSC organization has done a great job with ATSC 3.0. Silicondust has invested heavily in ATSC 3.0, developing both broadcaster-side and receiver-side products. We want ATSC 3.0 to succeed.

DRM is not part of the ATSC 3.0 standard managed by the ATSC organization. Rather it comes from the A3SA, a private organization made up of five television networks as the deciding members.

A brief history:

Silicondust formed in 2007, launching the first video gateway product for digital broadcast television in the home. 2007 was a great time for US innovation - television was going digital, computers were just becoming fast enough to handle TV content, home routers were becoming commonplace, and there was a free market that enabled innovation in the TV receiver marketplace. Customers love the HDHomeRun, with thousands of customers still using the 2007-era HDHomeRun devices today, 18 years later.

In 2011 Silicondust launched the first Cable industry approved video gateway product. The CableCARD based HDHomeRun for cable TV supports DRM encryption and can be used with all premium cable TV channels. This HDHomeRun model is the number two best selling retail CableCARD product.

In 2019 Silicondust took a big risk investing in developing an ATSC 3.0 video gateway. Silicondust launched a Kickstarter and delivered the first ATSC 3.0 video gateway devices to customers in October 2020. This was a success story of US innovation.

LG Display (LG Televisions) and SiliconDust:

LG is the number one selling brand of OLED televisions in the United States and the number two selling brand overall in the United States. One out of every two OLED televisions sold in the USA is made by LG. It should also be noted that LG had a major technical and leadership role in developing the ATSC 3.0 broadcast standard.

Every ATSC **1.0** LG television sold in the USA since 2019 supports everything needed to play ATSC 3.0 channels from a HDHomeRun video gateway including Widevine DRM needed for ATSC 3.0 protected channels.

That is roughly 35-40 million ATSC 1.0 LG televisions (2019 to 2024) already owned by people that should be able to receive ATSC 3.0 content with the simple addition of a HDHomeRun to their home.

In 2021 LG engaged Silicondust to make this happen. Once the concept was proven viewers would be able to channel-surf seamlessly between ATSC 1.0 channels (received by the television or via the HDHomeRun) and ATSC 3.0 channels (received via the HDHomeRun) **without having to buy a new television.**

With support from LG, Silicondust wrote an app for LG televisions that played all unencrypted ATSC 3.0 channels and played all recordings made by the HDHomeRun of unencrypted ATSC 3.0 channels.

LG and Silicondust approached A3SA together. This in itself should be concerning, that **we had to approach a private organization to try to get permission to make a consumer product where the sole purpose of the product was to enable people to watch and record the television being broadcast free on public airwaves. The five broadcast networks that make up the deciding members of the A3SA have asserted control over what was just five years ago a free market for TV receiver products. The free market is gone.**

If the A3SA had simply allowed protected channels to work like the DRM used by streaming services ATSC 3.0 would be in a much better place. There would be roughly 35-40 million more televisions that could receive ATSC 3.0 channels with the easy addition of a single HDHomeRun gateway in the home.

Encryption starts:

In 2022 Silicondust was informed that major network broadcasts would soon apply DRM to their primary channels. Silicondust has extensive experience with DRM and responded as follows:

- Silicondust became a licensed A3SA Adopter.
- Silicondust licensed Widevine DRM from the Widevine Licensing Authority for decrypting ATSC 3.0 content on the HDHomeRun device.
- Silicondust licensed DTCP2 DRM from the DTCP Licensing Authority for encrypting ATSC 3.0 content between the HDHomeRun device and the player device.

Silicondust soon discovered a fundamental problem in this - the DTCP2 robustness rules did not allow decryption from an installed app, rather DTCP2 must be built into the player device. There are no DTCP2 player devices available at retail in the US (that we are aware of), so, although Silicondust could be 100%

compliant with A3SA requirements, no customer would be able to watch TV.

The major broadcasters pushing DRM started encrypting their primary free channels anyway. Viewers would have been disenfranchised had it not been for the simulcast requirement.

Silicondust tried to help. Silicondust developed, documented, and tested a Silicondust-proposed security protocol that provided similar security features.

NextGen TV certification:

In July 2023, Silicondust completed NextGen TV certification and licensed the NextGen TV logo for use on HDHomeRun ATSC 3.0 products. Silicondust completed NextGen TV certification five (5) times, covering the following player platforms:

- Windows 11 (Ryzen 7 5800U tested)
- Mac (M1 Mac Mini tested)
- Android (Onn Android TV 2023 tested)
- Fire TV (Fire TV Cube 3rd gen tested)
- iOS (iPad Air 5th gen tested)

It should be mentioned that Microsoft XBox One (released in 2013) supports ATSC 3.0 content up to 1080p resolution when used with a HDHomeRun video gateway. Silicondust was unable to determine the number of active XBox users in the USA, but worldwide XBox has approximately 500 million active users. **A significant number of US households could watch ATSC 3.0 television using their existing XBox** with the simple addition of a HDHomeRun or similar video gateway, without requiring the purchase of a new television.

A3SA Device Specification Part 2 Local Content Protection:

February 26, 2024 the A3SA put out a public statement announcing a new “blueprint” specification to “allow innovators to develop new products for home networks”.

This statement claimed that A3SA had been “working in consultation with several electronics companies [...] developing [...] advanced home networking systems.” The A3SA did not include Silicondust in the development of this specification, nor did the A3SA inform Silicondust that this specification was being developed.

This statement further claimed that the “specification supports in-home streaming to applications hosted on [...] Android, Fire, Roku, WebOS, and Tizen, with iOS support in process”. Microsoft platforms including Surface, Windows, and XBox were not mentioned. Our conclusion from reading the A3SA specifications and rules referenced in this announcement, is that there is no pathway whereby a video gateway vendor could write an app for Roku, WebOS, Tizen, Apple TV, iPhone, iPad, XBox, Windows, or Mac supporting protected channels, even if the device is a NextGen TV certified television. Regarding Android, these extensive requirements are unnecessarily onerous, they block third party apps from working with the HDHomeRun, and they block the ability for viewers to remote view content from their own DVR, something they are allowed to do under US copyright law.

Also note that the specification is not a protocol specification that can be implemented, but is rather an extensive list of rules and requirements. I.e. **this A3SA specification is not a solution for video gateway devices but rather a list of special rules and requirements specifically targeting video gateway devices.**

These special rules and requirements targeting video gateway devices prevent a video gateway device from working with the wide range of the popular player devices people enjoy using to watch unencrypted ATSC 3.0 content today. This includes player devices that have been NextGen TV certified. Further, these newly invented rules came two years after Pearl member stations started DRM encrypting channels and came seven months after Silicondust had successfully completed NextGen TV certification, with the list of certified player devices being well known.

This situation highlights a fundamental problem when the receiver market is no longer a free market - vendors such as Silicondust have to wait for the A3SA to write a specification telling them how their own product must work. In this case the specification came almost 4 years after Silicondust launched the ATSC 3.0 HDHomeRun, and 2 years after stations started encrypting channels. And if, as with this specification, the A3SA decides a product must work in a way that is incompatible with Roku, WebOS, Tizen, Apple TV, iPhone, iPad, XBox, Windows, and Mac, then these platforms cannot work. Going back just five years there was a free market that fostered innovation.

Also note that these special rules and requirements targeting video gateway devices can be changed by the A3SA at any time, requiring just three of the five television networks that make up the A3SA to make changes. Many new rules and requirements have been added since the announcement in 2024.

Broadcaster products:

2024-2025 Silicondust continues to innovate ATSC 3.0 with new broadcaster products (that broadcasters are using).

Silicondust wants to talk about solutions. The Best Solution? De-regulate these private regulations.

Not allowing DRM on public airwaves is a solution. It is the solution that would be best for the US consumer and for device makers. It would restore fair-use rights to US consumers and restore the free-market for TV receivers. Free market means innovation, competition, and lower prices.

No change to the ATSC-org ATSC 3.0 standard required, and no change to existing products required.

The stated reason for DRM encryption is to prevent piracy, however it is not obvious to Silicondust how the DRM encryption being applied by the broadcasters pushing DRM might hinder commercial piracy operations.

Sports are often mentioned as a specific area where piracy affects operations. Broadcasters backing DRM encryption contend that streaming services are outcompeting them for sports rights, but that argument lacks credibility. Broadcast TV is the gold standard for sports, with streaming only existing around the edges. The NFL built professional football into an empire as the most popular sport in the US and did so primarily distributing their product via free and open broadcast television. New technologies such as high-definition video and 5.1 surround sound audio did not require DRM encryption. The NFL does continue to make limited pushes into the streaming space with rights deals with services like Netflix and Amazon Prime Video, but crucially continues to make those games available within the teams' home markets via free and open broadcast television. **We don't see why someone traveling away from home should now, new to ATSC 3.0, be denied the ability to watch their favorite teams using the remote viewing features of their own DVR.**

To stop applying DRM encryption broadcasters simply need to untick the DRM config option on the station video encoders. All broadcast video encoder encoder equipment supports not applying DRM encryption.

All existing ATSC 3.0 televisions and receiver equipment purchased by US consumers would continue to work, now with all channels available to all devices. Additionally, device makers can be free to develop tuning solutions by simply following ATSC 3.0 specifications versus going through a private review process. The cost to manufacture ATSC 3.0 equipment would be reduced with more competition in the retail marketplace.

The market would be back to allowing technical innovation where the next widget could be the next big thing for the success of television.

Much of FCC docket 16-142 could be closed as resolved.

The second solution - DRM the same as streaming services

June 6, 2025 the National Association of Broadcasters (NAB) filed a reply comment to the FCC (GN 16-142 Submission ID 10606861830907) that included the following statement:

> *"The encryption technology that broadcasters are beginning to deploy is the exact same technology used by YouTube and other free streaming services ([...]). It does not impose a cost on viewers or prevent viewers from saving programs on a digital video recorder (DVR) or impose a time restriction on how long a saved program can be retained on a DVR."*

This statement indicates that the National Association of Broadcasters finds the encryption (DRM) approach used by "YouTube and other free streaming services" acceptable. Silicondust takes this to mean Widevine DRM encryption specified by the A3SA and often used by streaming services including YouTube TV. Regular YouTube content does not appear to be DRM encrypted (observed 7/28/2025), likely because of the difficulty of ensuring playback for all YouTube customers.

Pluto TV is a similar free streaming service owned by Paramount Global, the parent company of CBS Entertainment Group. This demonstrates that the encryption (DRM) approach used by Pluto TV today is acceptable to Paramount for protecting CBS content.

Fox has a free streaming channel 'LiveNOW from FOX'. The content is not DRM encrypted (observed 7/25/2025).

This statement by the National Association of Broadcasters is positive. It is something that Silicondust can implement and may be a solution for docket 16-142.

Reiterating that Silicondust does not speak for our customers or the people who filed Docket 16-142 comments. We therefore cannot say if the following DRM solution based on streaming services will be acceptable to our customers or to the people who filed Docket 16-142 comments.

The second sentence by the National Association of Broadcasters (NAB) reassures us that DVRs will not be restricted. Silicondust appreciates this commitment by the NAB and recommends these safeguards be codified as consumer protections as noted later in this letter.

The problem is that the DRM approach required by the A3SA for video gateway devices is NOT the same as "YouTube and other free streaming services". It is Widevine, but it is Widevine PLUS significant extra requirements added by the A3SA if the product is a gateway device. **Simply making the DRM approach the same as "YouTube and other free streaming services", as is indicated to be acceptable to broadcasters, may be a solution for docket 16-142.**

It is also incorrect to say "It does not impose a cost on viewers". While the approach used by "YouTube and other free streaming services" incurs a minor one time development cost for the product vendor, the DRM approach required by the A3SA for gateway devices incurs significant development costs and ongoing costs – money that must be paid by the product vendor. **Using the DRM approach used by "YouTube and other free streaming services" would reduce the cost to the receiver vendors**

making lower product prices possible, AND allow consumers to use many of the player devices they already have with minimal investment.

Consider a NextGen TV television such as the LG 2021 G1.

This television can be used today to watch Widevine DRM protected "YouTube [TV] and other free streaming" channels (IP over WiFi).

This television can be used to watch Widevine DRM protected ATSC 3.0 channels (IP over ATSC 3.0).

The television can be used to watch unencrypted ATSC 3.0 channels from a video gateway (IP over WiFi).

However, due to A3SA rules for gateway devices, the television is not able to display Widevine DRM protected ATSC 3.0 channels if the television receives the content using IP over WiFi (just "like YouTube and other free streaming services"), even though the television contains all the technology components required to do so.

Silicondust asserts that a video gateway delivering over WiFi to a player device (ATSC 3.0 usage) should be treated the same as a home router delivering over WiFi to a player device (YouTube TV usage).

Important points comparing a home router (gateway) with a video gateway:

1. The user's home router is not involved with the security of Youtube DRM encrypted content because the user's home router simply passes the encrypted audio and video segments through to the user's home network. The same is true for video gateway devices.

2. The user's home router doesn't know how to decode audio or video data, DRM encrypted or not. The audio/video data is just as meaningless to the home router (gateway) when encrypted or not encrypted. The same is true for video gateway devices.

3. The user's home router wasn't approved or not approved by YouTube. Likewise a video gateway should not require approval from A3SA.

4. The user's home router does not store a certificate with a secret key from YouTube. A video gateway does not connect to A3SA and should not require a certificate with a secret key from A3SA.

5. The app or webpage presenting YouTube content is not involved in securing the content. The app or webpage simply passes the manifest URL to the player component supplied by the operating system on the player device where the decryption and rendering occur. The same should be true for an app that works with a video gateway device, thus there should be no requirement for A3SA to be involved in approving the app, thus there should be no restrictions on third party apps.

6. The app or webpage doesn't need a secret key from YouTube. Likewise an app that works with a video gateway device shouldn't need a secret key from A3SA.

Recording support is also not relevant to DRM handling. When recording, the video gateway stores the data without understanding how to decode the video (DRM encrypted or not). When the user later plays the recording the video gateway retrieves the data delivering it to the player device, again without understanding how to decode the video (DRM encrypted or not). There is no need to track how long a recording has been stored as "[The DRM used] does not [...] impose a time restriction on how long a saved program can be retained on a DVR."

For DRM encryption to work the same as “YouTube and other free streaming services” (as described by the National Association of Broadcasters) the A3SA must remove all requirements that go above and beyond Widevine DRM encryption. This includes removing the requirement for a TLS client certificate authorized by the A3SA when connecting to the A3SA licensing server. This client certificate is the technical mechanism the A3SA uses to restrict receiver vendors from tuning television content on public airwaves.

Doing so would enable playback of DRM encrypted content on Android devices, Fire devices, Roku devices, Tizen devices, and webOS devices not possible or onerously constrained today.

A3SA would retain the ability to block compromised player devices by Widevine System ID, same as how YouTube blocks compromised player devices.

No change to the ATSC-org ATSC 3.0 standard required, and no change to existing DRM-supporting products required. ATSC 3.0 televisions would not be affected by this change and would continue to work.

Apple TV, iPhone, iPad, Mac:

Apple does not support Widevine DRM. Rather Apple has their own DRM approach called FairPlay.

Streaming services that use DRM encryption use FairPlay instead of Widevine when streaming to an Apple device. The encryption applied to the audio/video data is different to the encryption currently required by A3SA.

Playing all broadcast channels on Apple TV, iPhone, iPad, and Mac is a problem that must be solved before DRM can be considered. Apple TV, iPhone, iPad, and Mac are ATSC 3.0 capable, with the iPad Air and the Mac M1 having passed NextGen TV certification when used with a HDHomeRun video gateway.

Microsoft Surface, XBox, Windows PCs:

Microsoft has limited support for Widevine DRM to help web browsers. This limited support is not useful for ATSC 3.0 DRM content due to the use of HEVC video on ATSC 3.0 and this support not being available to universal (UWP) apps. Rather Microsoft has their own DRM approach called PlayReady.

PlayReady and Widevine share the same encryption method but with different licensing data. Streaming services that use DRM have two choices for Microsoft platforms – provide both PlayReady and Widevine licensing servers for all content, or accept the limitations of Microsoft’s limited Widevine support for web browsers.

Playing all broadcast channels on Microsoft Surface, XBox, and Windows within UWP apps is a problem that must be solved before DRM can be considered. Microsoft Surface, XBox, and Windows are ATSC 3.0 capable, with Windows 11 having passed NextGen TV certification when used with a HDHomeRun video gateway.

Consumer protections required if this DRM approach is to be considered as a solution:

- The ability to prevent video recorders from recording content is a standard feature of Widevine DRM. The National Association of Broadcasters states that the DRM being applied does not prevent viewers from saving programs on a digital video recorder. Silicondust recommends the following consumer safeguard:

    1. Broadcasters must not prevent video recorders from recording television.

    2. If signaled not to record, a video recorder must be allowed to ignore this signal, must be allowed to record the television content, and later viewing of the recording must not be prevented.

- The ability to impose a time restriction on how long a saved program can be retained is a standard feature of Widevine DRM. The National Association of Broadcasters says that the DRM being applied does not impose a time restriction on how long a saved program can be retained on a DVR. Silicondust recommends the following consumer safeguard:

    1. Broadcasters must not prevent the viewing of a recording due to time.

    2. If signaled to expire a recording based on time, a video recorder may ignore this signal and viewing must not be prevented.

- Fair use must not be inhibited. This includes not inhibiting the consumer from remote viewing their TV shows from their DVR as allowed today with ATSC 1.0.

- Third-party apps must not be inhibited or require approval.

Further concerns that would need to be addressed if this DRM solution is to be considered:

- The A3SA is not bound to Widevine as the DRM system. A3SA could, for example, invent a new DRM scheme or “find” a new DRM scheme that isn’t supported by general purpose player devices. Television and set top box makers could then be told they need to support this new DRM scheme in order to continue to support protected channels. This could back-door block the use of gateway products purchased by TV viewers.

- The A3SA could ask Widevine to add something new to the digital signaling in Widevine to block viewing on general purpose player devices while allowing only televisions and devices approved by A3SA to render content. This could back-door block or curtail the use of gateway products purchased by TV viewers.

- The cloud based licensing server that approves playback of broadcast content could deny or selectively deny requests beyond the accepted use of blocking compromised player devices. This could back-door block or curtail the use of gateway products purchased by TV viewers.

If the challenges of playing Widevine DRM content on Apple and Microsoft platforms can be solved this solution would meet the National Association of Broadcasters statement of being the same as “YouTube and other free streaming services. It would provide live TV and DVR features to most player devices used by video gateway customers.

It would also solve the problem of ATSC 3.0 NextGen TV certified televisions not being able to play content from ATSC 3.0 NextGen TV certified video gateway devices such as the HDHomeRun.

Conclusion:

The current situation is hurting our customers and hurting ATSC 3.0 adoption. Silicondust wants ATSC 3.0 to succeed, HOWEVER **the broadcast industry is attempting to use ATSC 3.0 to illegally limit access to public airwaves.** Any video gateway product must be blessed by the A3SA. To be blessed, a video gateway vendor must follow a set of arbitrary rules and regulations created in secret by this private industry. These arbitrary rules and regulations appear designed to make video gateway devices as untenable as possible. The end result restricts the US public from exercising their fair use right to choose when, where, and how they watch broadcast television. In contrast, the TV receiver market was a free market just five years ago, not requiring permission from the private broadcast industry to tune television content.

These secret A3SA rules go against the official position of the National Association of Broadcasters.

Never in the history of television and radio has a receiver been effectively denied access to tuning the public airways as the Silicondust HDHomeRun has. This must be stopped.

The TV receiver market is being regulated by the private broadcast industry (a different industry), something they have no authority to do.

Silicondust has been restricted from this market. Customers love our product so much they organized their own effort to bring this matter to the FCC's attention.

This could be solved today. Silicondust presented two solutions, the first is to "deregulate" the opaque rules A3SA member stations have put in place and thus reinstate the free market by not allowing DRM on public airwaves. The second is based on statements made by the National Association of Broadcasters to the FCC.

If DRM is to be forced on the American people, we ask that it be open for public review and comment. We ask that there be protections to keep the TV receiver market a free market. We ask that there be consumer protections to protect long established fair use. We ask that it not exceed that of "YouTube and other free streaming services". And we ask that broadcasts be DRM-free until such time as the DRM approach is approved by the FCC.

Until this is resolved Silicondust asks that any ATSC 1.0 sunset be postponed and the simulcast requirement remain in effect so HDHomeRun video gateway customers can continue to have access to all broadcast television content as they have been able to since 2007. This is not desirable but it is unfortunately required until this problem is resolved.

Silicondust urges the FCC to ask broadcasters to stop using DRM encryption on public airwaves in the interim while further arguments are heard from all parties. This should be harmless to broadcasters due to the simulcast requirement.

We look forward to working with the commission on finding a solution and are always available to answer any questions.

Sincerely,

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