netmagic
When it's mission critical

Secretary,
Office of the Secretary,
Federal Communications Commission
445 12th Street S.W.,
Washington, D.C. 20554

December 21, 2009

Re: "Comments –NBP Public Notice # 27."
GN Docket Nos. 09-47, 09-51, 09-137; CS Docket No. 97-80

Dear Commissioners,

Your Public Notice seeking comments on encouraging innovation in the market for video devices is very timely. As we see robust growth in video usage over the internet market forces continue to create a very fragmented landscape with a mix of proprietary competing standards. The trend is towards the walled garden scenario that exists today with Cable and Satellite distribution channels where businesses hope to lock in their customers. Ultimately both parties, consumers and operators stand to loose.

Our response to this Public Notice are based on an existing platform for video distribution to the living room, that has been developed by us and is in pilot today. This system is designed on 'Open' principles and it includes an OpenDRM technology that guarantees accounting of all content viewed by consumers.

We thank you for consideration of our comments and look forward to participating fully should you decide to issue a Notice of Inquiry in this area.

Sincerely,

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Comments – NBP Public Notice #27

(FCC Preamble and Questions are in Black color)

COMMENT SOUGHT ON VIDEO DEVICE INNOVATION

Federal Communications Commission
445 12th St., S.W.
Washington, D.C. 20554

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The convergence of the television and content delivered by IP makes this a critical time to promote innovation in set-top devices that could support the Commission's effort to drive broadband adoption and utilization. Accordingly, the Commission wishes to consider taking an active role in formulating a solution that will spur the development of a retail market for nationally portable video devices that will work across all delivery platforms, including MVPD platforms and broadband-based video platforms. We seek comments on the following specific issues to help us better understand these issues as we develop a National Broadband Plan.

(Netmagic Comments on FCC Questions are in Blue color)

A. What technological and market-based limitations keep retail video devices from accessing all forms of video content that consumers want to watch?

Consumers can choose from a plethora of devices that are able to access Internet video, but it appears that none of these devices are able to access all types of video content, and few of them are able to access MVPD content. Consumers can access the Internet using a variety of delivery methods (e.g., wireless, DSL, fiber optics, broadband over powerlines, satellite, and cable) on myriad devices made by hundreds of manufacturers; yet we know of no device available at retail that can access all of an MVPD's services across that MVPD's entire footprint. We seek comment on the technological and market limitations that explain this disparity.

A cost-effective retail device is possible with current technology using existing building blocks. With this it is possible for a consumer to watch any video content available on internet.

The problem is not of technology which restricts viewing of content, but rather that of the compulsions of the Content Aggregator which restricts its availability to regions where he has control. The Content Aggregators have been resorting to proprietary formats and encryptions to restrict the usage and curb piracy. In turn, this has been making life very difficult for the consumer – he has been interpreting DRM as Digital Restrictions Management rather than Rights management.

Apple iTunes has been the first one to break through the vicious circle of the mistrust of the content industry, and been able to win over consumer confidence too. Still its proprietary nature and built-in limitations have been restricting its wide-spread adoption.

What is needed is an Open DRM, which is also simple minded and doesn't try to overdo things. It has to guard the rights of the Content Aggregator as well as the Consumer. It has to give peace of mind for both. It has to be such that contents can float anywhere in their encrypted form, and yet be accounted for when they get used. This Open DRM will over-night change the erstwhile Pirates to low-cost Content Distributors.

With the OpenDRM, the Content Aggregator can define policies for the contents, independent of the MVPDs – all from his own server. He can define rates for the Prime contents, and can change them on a day-to-day basis while people are willing to pay separately. Even after this, he can continue earning by giving the contents on a Library basis, where he gets to share the Library fees on a proportionate use basis. The Content Aggregator can restrict his content usage to specific regions in the world based on his copyrights, and can even charge different rates for different regions. For a prime content he can confine it to be played for specified duration only on devices with a secure HDMI output. He can ask for a watermark or Device ID to be intermittently overlaid on the content, to discourage camera copies.

The OpenDRM will also make possible secure TV Apps, developed by third parties to be purchased in a manner similar to payment for contents. These TV apps can even cater to existing Conditional Access systems, so that a user can have access to proprietary contents based on them. This will free the user, to incrementally subscribe to newer services from MVPDs – and pay through a common billing.

The OpenDRM will allow multitude of compatible navigation devices to emerge, based on different processors, firmwares and operating systems from multiple manufacturer. The consumer will have rich choices ranging from cost-effective to versatile products – as has happened in the case of mobiles.

The solution will be very network friendly, and would assure the Content Aggregator that his HD level contents would be available to every device without getting affected by the network bandwidths. This immediate distribution of content would be possible, as the same can now be downloaded from a multitude of mirror servers, shared through Peer-to-Peer networks, downloaded from broadcast media or copied from physical mediums like USB drives and DVDs.

It will be a new world where best of the contents will be available anytime, anywhere to anyone, and yet each usage can result in revenue for the Content Aggregator. The consumer just needs to have one device and one remote in front of the TV, to access any of the contents – just like the internet.

1. What limitations prevent consumer electronics manufacturers from developing a true "plug-and-play" device that is network agnostic?

There are no technological limitations – this has more to do with business perceptions. The current perception is that a proprietary play with dedicated devices can generate more revenue, this will change with a "network agnostic" device generating more business – like operator agnostic mobile phones.

This plug-and-play device, like a mobile, should be able to register itself with any MVPD. This will allow the MVPD to bill for usage, and distribute the revenues amongst the Content Aggregators whose contents are consumed.

2. What technical or market limitations keep certain video devices from accessing video services to which a consumer has subscribed?

The biggest limitation today is the proprietary Conditional Access (CA) systems or Digital Rights Management (DRM) systems. Each one limits the user to the contents in a walled garden. The Content Aggregator also limits his reach through marketing tie-ups with some walled-garden networks.

All this is completely unnecessary. Our retail device shows how an Open DRM implementation eliminates the technical limitations while serving the market interests o both the consumer (convenience) and the Content Aggregator (control). We even cater to the interest of the existing proprietary CA systems (a larger user base), by allowing them to co-exist as TV Apps.

3. With respect to Internet access, consumers can purchase or lease interface devices (for example, cable modems) that perform all of the network-specific functions and connect via Ethernet ports to a multitude of competitively provided consumer devices including computers, printers, game consoles, digital media devices, wireless routers, refrigerators, network storage devices, and more. What technical or market limitations prevent video content distributors from providing similar devices that allow for innovation in the navigation device market?

Our design embodies the same spirit and philosophy of Internet development. Therefore we have designed an **open device** which allows access of contents through standard Ethernet interface for ADSL, Fibre, PON, WiFi, WiMax and Cable Modems. Through USB interface it allows access of Flash drives, hard-drives and DVD drives. Through a Box Connector it allows attachment of a single/dual tuner for Cable, Satellite or Terrestrial. The common internet content formats are used in all these mediums.

Content is successfully decoupled from the delivery medium, and navigation from the content. Thus, innovation on the navigation front can continue, without affecting the compatibility.

The real restrictions come not from technology but from licensing and regulatory conditions imposed on the service providers. This in turn has forced them to create incompatibility barriers to protect their turf.

B. Would a retail market for network agnostic video devices spur broadband use and adoption and achieve Section 629's goal of a competitive navigation device market for all MVPDs?

In June 2007, the Commission released a Further Notice of Proposed Rulemaking seeking comment on competing proposals for bidirectional compatibility between cable systems and consumer electronics devices. The Commission sought comment also on other approaches that would assure consumer electronics device compatibility with all MVPDs. Some parties argued that an all-MVPD solution "likely would require years for all the affected parties to address and act on the complex technical and business issues inherent in such an approach," while others argued that an all-MVPD approach is the only way to achieve Section 629's goal of a competitive market for navigation devices. We seek further comment on this issue.

As discussed before, an "All-MVPD" device is easily possible with existing technologies and would become more cost-effective in the long term than dedicated devices. It is hard to miss the retail parallel with IBM-PC in the early 80s and the revolution in computing access it made possible for everyone.

All-MVPD device has elegant technical simplifications instead of complexities. A common standard for it will catalyze the business further (like in internet). This will achieve the Commission's objective of maximizing penetration of the navigation devices through a competitive market.

1. How could the Commission develop a standard that would achieve a retail market for devices that can attach to all MVPD networks and access Internet-based video sources?

This can be done in the spirit of the internet, based on existing standards. FCC could seek the help of a professional organization (like IETF) to manage the standards development while retaining the rights over ratification. We suggest to look at the following areas:

a) Audio/Video Codecs to be used for interoperability (recommended H.264/AAC). Container format to be used (Transport Stream or MKV)
b) Encryption to be used for content files (or channels) – preferably AES-128.
c) A convention for "Universal Content Locator" (UCL), which allows a unique name to be given to each content, with embedded IDs, such as that of the Content Aggregator. While the URL (Universal Resource Locator) allows contents to be located on servers, the UCL allows the contents to float anywhere and become server and network agnostic.
d) Public/Private key encryption to be used for encoding and decoding of keys – preferably RSA 2048.
e) A "Transport Stream Connector" needs to be standardized by FCC, which allows single or dual tuners from a third party to be attached to the device. These tuners can cater to satellite, cable or terrestrial. The minimum signals required are:
    i. 5V supply and ground
    ii. Two serial transport stream interface (8 signals)
    iii. I2C bus for control
f) The secure boot loader procedure by which a secure processor within a STB chip, after the first powering, would generate a pair of private and public key for the STB device. It would retain the private key in its secure memory, but will securely transport the MAC ID and the public key to a Certification Authority (may be FCC).
g) The procedure within the secure processor whereby the content decryption and playing happens within the STB chip, and clear content/keys are never available to the application processor.
h) The procedure by which the secure processor generates a Log of all the content playing transactions, and sends it securely/periodically to the Certification Authority. A secure Acknowledge would be needed from the Certification Authority within a stipulated time, failing which the secure processor would suspend content playing

operations. This would guarantee the Content Owners that their content can't be played indefinitely without further permissions/accounting.

i) The procedure by which a MVPD provider (instead of the Certification Authority) can "register" a device (like in mobile phones) and henceforth collect the Log files and give Acknowledges. The MVPD is then responsible for billing and distribution of revenues.

Such an ecology based on the simple steps above is already operational elsewhere in the world on a pilot basis, and we would be glad to share the details with FCC, so that the standardization activity can be taken up with suitable bodies.

2. What are the pros and cons of each of these types of solutions, and which one would do the most to promote broadband adoption and utilization? Would any inhibit broadband adoption and utilization

There will be almost no cons for such a device, as it would extend the flexibility of the internet to all the precious videos in the world. An additional pro will be evolution of an ecosystem which will benefit the Content Owners, Content Aggregators, MVPD operators, and above all the consumer.

The broadband connections will be 100% utilized, and will get supplemented by physical mediums such as USB drives, DVD drives etc, which are ubiquitous. These devices can enter many non broad-band homes on a stand-alone basis, and will make those homes adopt broadband.

C. Can the home broadband service model be adapted to allow video networks to connect and interact with home video network devices such as televisions, DVRs, and Home Theater PCs via a multimedia home networking standard?

Home broadband service separates the elements specific to the platform by using a gateway device, such as a cable modem, DSL modem, or optical network terminal to convert the signals to Ethernet, the *de facto* home-networking standard. The Digital Living Network Alliance ("DLNA") and the High Definition Audio/Video Networking Alliance ("HANA") each assert that their home networking standards would be well suited to connect interface devices to a consumer's home network, as an analogue to Ethernet in the data networking world. We seek comment on how these standards would be implemented.

All the devices can communicate using Ethernet the *de-facto* home networking standard.

1. Are DLNA and HANA the only home networking standards that the Commission should consider in reviewing this model? If not, which other standards should the Commission consider?

DLNA seems to be more popular.

2. What are the strengths and weaknesses of each home networking standard?

Each standard has its pros and cons and there will be advocates on each side. The truth will be of application specific nature, and user may like to select a home networking standard based on application needs.

3. Would any of these standards allow consumers to use existing technology? For example, many devices already in consumers' homes can accept firmware upgrades and are already DLNA or HANA certified. Could the Commission adopt a network interface standard that allows those devices to connect to an MVPD network?

Ethernet alone can ensure that any MVPD service provider will be able to interface to any home device. DLNA, HANA or other Home Networking standards can be optional for allowing a higher level of interaction between devices at home.

D. What obstacles stand in the way of video convergence?

The Commission's CableCARD rules have resulted in limited success in developing a retail market for navigation devices. Certification for plug-and-play devices is costly and complex. The tru2way license requires device manufacturers to separate cable navigation from all other functions that the device performs. On the other hand, devices like TiVo, Moxi, Microsoft's Xbox 360, AppleTV, Roku, Sony's Playstation 3, and Vudu each use a consistent menu as they navigate through video content regardless of its source. Certain elements of MVPD technology move at a faster pace than technology on
the consumer device side (*e.g.*, the adoption of switched digital video), and vice versa (*e.g.*, the adoption of advanced video codecs in consumer devices). We seek comment on how to encourage innovation.

There is a need for the Commission to specify the core standards required for "interoperability" (like GSM in the case of mobiles), while leaving the navigation and human interface features to the device manufacturers.

Key amongst the interoperability is use of standard audio/video codecs and the container format. One standard which is already popular is that for the H.264 for all kind of videos and AAC for all kind of audios. The container format can be as simple as Transport Stream or versatile as MKV.

Another key for interoperability is a standard connector for Tuner Interface as outlined in B.1.d above. The devices which don't provide this interface, can allow USB based tuners to be added. This way, each device can cater to both the demand and broadcast interfaces.

1. Given the flood of video content that is now available from a multitude of sources, what obstacles stand in the way of allowing consumers to navigate those sources? What can the Commission do to eliminate those obstacles?

The obstacles are incompatible video/audio/transport codec standards. Some of these have artificial licensing obstacles for usage on various embedded devices.

The other major obstacle is that of propriety encryption systems. This problem will disappear if all the contents were encoded using say AES-128, and Public/Private keys used say RSA 2048. The procedures for encoding/decoding contents/keys within secure processors need to be specified. This itself will constitute the Open DRM.

2. Is there a solution that would allow MVPDs to continue innovating without making navigation devices obsolete when MVPDs adopt incompatible delivery methods?

The solution is in usage of Universal Encrypted Contents, which can be decoded by any registered navigation device. The content delivery method of the MVPD effectively gets decoupled from the navigation method in each device. Each can independently evolve. The content data will remain the same irrespective of the interface through it was delivered (same as in internet).

3. Would a network interface solution address the concerns raised regarding cost and complexity of device certification and approval? Why or why not?

We are assuming that the issue out here is not the mandatory approval for all electronic/telecom equipments as required by FCC Part 15 or part 68.
The cost and complexity of additional device certification and approval (as in the CableCard) will completely disappear for the following reasons:

a) Each device needs to be certified only at the time of the manufacturing. This would happen automatically when the device announces its birth to the Certification Authority, by sending to it, the MAC-ID and a self-generated Public-key.
b) The above process happens within a secure processor of the STB chip, with the code downloaded from a Secure Flash boot. There cannot be therefore any clone or rogue devices.
c) The Certification Authority makes available the Public key of the certified devices to the requesting Servers of the Content Aggregators or MVPDs. This would allow them to send keys/messages in a secure manner to the devices.