

ATTACHMENT A

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The Broadcast Flag: A Practical Overview

The following scenarios illustrate how devices in accord with the Compliance and Robustness Requirements included in Attachment B of the Initial Joint Comments of the MPAA, et al., would treat broadcast content in some sample situations.

Scenario 1: Over-The-Air Broadcast DTV Content Received By An Integrated DTV And Recorded On An Analog VHS Machine



Scenario 1

This is a common consumer scenario wherein a DTV signal is received via antenna and provided directly to a DTV set, which also has an analog VCR for Standard Definition recording and playing back Standard Definition pre-recorded content. (“Standard Definition” means any format included in Rec. ITU-R BT.601-5 “Studio Encoding Parameters of Digital Television for Standard 4:3 and Widescreen 16:9 Aspect Ratios” (Oct. 1995).)

1. A radio frequency (RF) signal is received by a digital television through its antenna, and conveyed by wire and circuit board from the tuner to a demodulator. See Figure 1 below.
Status of the content: unencrypted, unusable.

Note: The “Demodulation Function” defined in the Requirements means a component, or set of components, that is designed to perform the function of 8-VSB, 16-VSB, 64-QAM or 256-QAM demodulation and thereby produce a data stream consistent with ATSC Standard A/53 Annex C (e.g., a demodulation chip or demodulation software).”

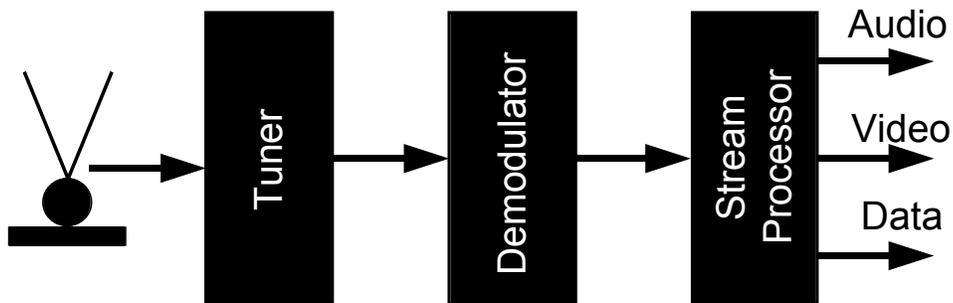


Figure 1: DTV Functional Components

2. A digital transport stream signal is obtained from the demodulator implemented in silicon chip sets. The demodulated content is then sent to a subsequent functional element (a transport stream processor or TSP) to discover the data structures necessary to find and recover the audio, video, and associated program data such as the Broadcast Flag, captioning and ratings information, electronic program guide (EPG) data, and other information. The connection between the functions must be tamper-proof in compliance with the Robustness Requirements. *Status: unencrypted, usable, unscreened.*¹
3. In the course of transport stream processing, the EIT (Event Information Table containing program event information) or the PMT (Program Map Table, a structure within in the MPEG video stream) is checked for the rc_descriptor.

- a. **Unmarked Content:** If the rc_descriptor is not found within the transport stream it means that the content is unmarked. The audio, video, and associated data content and an indication (as *additional information*) of the unmarked content status are sent to the rest of the digital television set. The connections between the transport stream processor and the rest of the components of the digital television set must be tamper-proof in compliance with the Robustness Requirements. *Status: unencrypted, usable, screened, unmarked.*

At each output from the television set, the *additional information* is read to determine if the content is marked or unmarked. The set is constructed such that content that is unmarked it may flow to any available output, and be recorded using any available recording method. The regulation no longer applies to the content, and the consumer is not technologically restricted from doing whatever desired with the content, including making unlimited copies. *Status: unencrypted, screened, unmarked, usable.*

- b. **Marked Content:** If the rc_descriptor is found within the transport stream it means that the content is marked. The audio, video, and associated data content and an indication of the marked content status (as *additional information*) are sent to the rest of the digital television set. The connections between the transport stream processor and the rest of the components of the digital television set must be tamper-proof in compliance with the Robustness Requirements. *Status: unencrypted, usable, screened, marked.*

At each output from the television set, the *additional information* is read to determine if the content is marked. Under the regulation, the set is constructed such that marked content may only flow to one of the outputs identified in Table 1 below. In this scenario, the TV set's only output is an **analog output** to an analog Standard Definition VCR. The content is no longer subject to the regulation. The VCR or analog display does not have to comply with the Requirements. The consumer is not technologically restricted from doing whatever he or she wants with the content, including making unlimited copies. *Status: unencrypted, usable.*

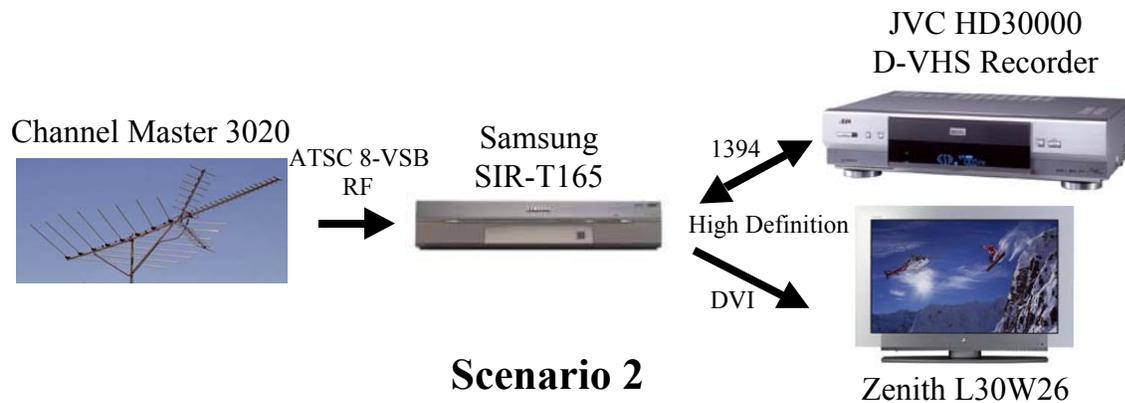
¹ "Unscreened Content" and "Marked Content" are defined terms in the Requirements, and have the same meanings in this Attachment. See Initial Joint Comments, Attachment B § X.1.

When the Standard Definition analog content is played back from the VCR, the TV set receives and displays the content normally. *Status: unencrypted, usable.*

<p>Analog output. The content moves to an analog output, such as a Standard Definition component or composite NTSC analog output to an older-model standard definition analog VCR or analog display.</p>
<p>Modulated output. The content moves to an RF modulated output, such as an 8-VSB modulated output, and is sent to an 8-VSB receiver elsewhere in the household. (Such devices are not yet in existence, but may be in the future).</p>
<p>Protected digital output. The content moves to a digital output protected by an Authorized Digital Output Protection Technology. An example of such an output might be a IEEE 1394 output protected by 5C DTCP, assuming DTCP is admitted to Table A or HDMI with HDCP assuming HDCP is admitted to Table A.</p>
<p>Device exercises sole control over the content. The device encrypts the content and sends it out an unprotected digital output. The device has the only key necessary to decrypt the content. The content is only usable if it is returned to the same device for decryption.</p>
<p>Certain computer legacy DVI outputs. The content is sent out of a computer product to an unprotected DVI 1.0 digital output that is constrained to 480x720 resolution for a 16:9 aspect ratio and no more than 30 frames per second, for example to a 480x720 digital display product, and may use video processing techniques to improve the perceived quality of the image.</p>
<p>Bound recording. The content is encrypted or otherwise protected by the recorder such that it cannot be accessed by any other device.</p>
<p>Authorized Recording Method. The content is encrypted by an Authorized Recording Method, then sent out a digital output to a compliant recorder, such as a recordable DVD drive. An example of such a recording method might be 4C CPRM, assuming CPRM is admitted to Table A and authorized for recording to removable media.</p>

Table 1. Permitted Outputs for Marked Content

Scenario 2: Over-The-Air Broadcast DTV Content Received By A Set Top Box, Recorded On A D-VHS Machine And Viewed On A Wide Screen LCD Display



Scenario 2

Scenario 2 is similar to Scenario 1 except that the DTV receiver's tuner, demodulator, and transport stream processing functions (see Figure 1) are contained within a separate set top box (STB) which attaches to a digital LCD widescreen monitor with a DVI connection and a D-VHS recorder capable of recording and playback of High-Definition² DTV programs through a 1394 digital connection. The distribution of reception, display, and recording devices permits consumers to position the various individual components of the system as they see fit.

1. A radio frequency (RF) signal is received by a digital television through its antenna, and conveyed by wire and circuit board from the tuner to a demodulation function. *Status of the content: unencrypted, unusable.*
2. A digital transport stream signal is obtained from the demodulation function. The demodulated content is then sent to a subsequent functional element (a transport stream processor or TSP) to discover the data structures necessary to find and recover the audio, video, and associated program data such as the Broadcast Flag, captioning and ratings information, electronic program guide (EPG) data, or other information. The connection between the functions must be tamper-proof in compliance with the Robustness Requirements. *Status: unencrypted, usable, unscreened.*
3. In the course of transport stream processing, the EIT (Event Information Table containing program event information) or the PMT (Program Map Table, a structure within in the MPEG video stream) is checked for the rc_descriptor. If the rc_descriptor is not found within the transport stream it means that the content is unmarked. If the rc_descriptor is found within the transport stream it means that the content is marked. The audio, video, and associated data content and an indication (as *additional information*) of the marked or unmarked content status are sent to the rest of the digital STB. The connections between the transport stream processor and the rest of the components of the digital

² I.e., any format with resolution higher than those included in Rec. ITU-R BT.601-5 "Studio Encoding Parameters of Digital Television for Standard 4:3 and Widescreen 16:9 Aspect Ratios" (Oct. 1995).

television component system must be tamper-proof in compliance with the Robustness Requirements. *Status: unencrypted, usable, screened, marked or unmarked.* At each output from the television set, the *additional information* is read to determine if the content is marked or unmarked.

- a. **Unmarked content:** The STB is constructed such that content that is unmarked may flow to any available output, and be recorded using any available recording method. The regulation no longer applies to the content, and the consumer is not technologically restricted from doing whatever he or she wants with the content, including making unlimited copies. *Status: unencrypted, usable.*
- b. **Marked content:** Under the regulation, the set is constructed such that marked content may only flow to one of the outputs identified in Table 1, above. In this scenario, the STB has one Digital Video Interface (DVI), an existing **protected digital output** technology, to a High-Definition DTV display. The DVI interface is protected using HDCP. Before sending the content, the STB verifies that the display is an HDCP licensed receiving device. After verification, the content is encrypted and sent to the display, where the signal is decrypted and displayed. The content is no longer subject to the regulation, and the display is not subject to the Requirements.

The other output in this scenario is across an IEEE 1394 interface, another **protected digital output**, to a D-VHS recorder. The 1394 interface is protected using DTCP. Before sending the content, the STB verifies that the D-VHS recorder is a DTCP licensed receiving device. After verification, the content is encrypted and sent to the D-VHS recorder for recording. The content is no longer subject to the regulation, and the recorder is not subject to the Requirements. The consumer is not technologically restricted from doing whatever desired with the content, including making unlimited copies, which can be played on any DTCP D-VHS player.

In accordance with the DTCP license, when the content is played back from the D-VHS recorder, the recorder will verify that the STB is a DTCP licensed receiving device. Upon verification, the content is sent to the STB, and decrypted, before being output to the DVI for presentation on the display. The recorder is required under the DTCP license to comply with the requirements similar to those contained in the regulation. Under the license, the recorder will again pass the content as described above to the DVI **protected digital output**.

Scenario 3: Over-The-Air Broadcast DTV Retransmitted by Cable System Headend



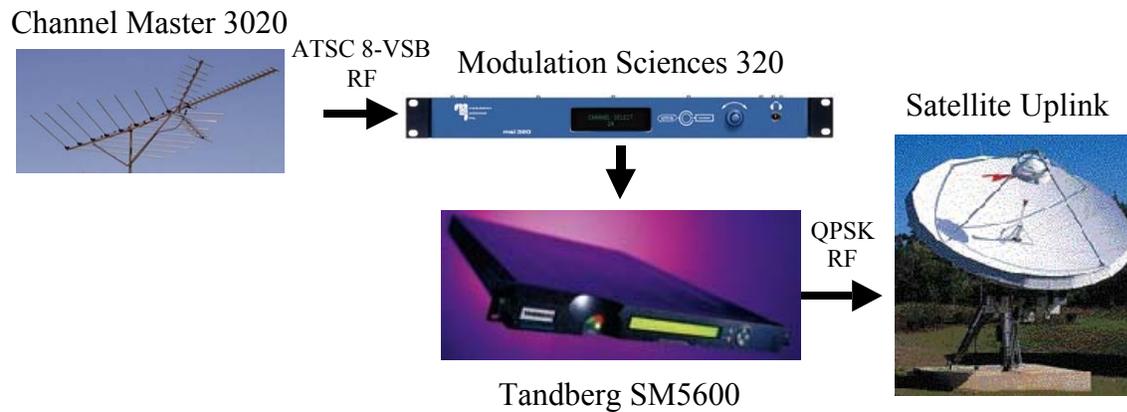
Scenario 3 illustrates how professional cable system headend facilities could receive over-the-air DTV stations for insertion of digital content onto their digital transmission facilities for transmission to set top boxes (STBs) within consumers' homes as will be illustrated in Scenario 5.

1. The signal is received by an 8-VSB receiver through an antenna from an over-the-air broadcast at a cable system's head end. The signal is conveyed by wire and circuit board to a demodulation function. *Status of the content: unencrypted, unusable.*
2. A digital transport stream signal is obtained from the demodulation function. The demodulated content is then sent to a subsequent functional element (a transport stream processor or TSP) to discover the data structures necessary to find and recover the audio, video, and associated program data such as the Broadcast Flag, captioning and ratings information, as well as electronic program guide (EPG) data. The connection between the two functions is not tamper-proof in compliance with the Robustness Requirements. The cable system operator has filed a written commitment with the Commission pursuant to Section X.2(c)(3)(C) of the Requirements, stating that it is a cable operator, allowing the cable system operator to purchase the noncompliant receiver. *Status: unencrypted, usable, unscreened.*
3. In the course of transport stream processing, the EIT (Event Information Table containing program event information) or the PMT (Program Map Table, a structure within in the MPEG video stream) is checked for the rc_descriptor. If the rc_descriptor is found within the transport stream it means that the content is marked. If the content is marked, the TSP creates *additional information* noting that the Flag has been checked and found to be marked. The content and the *additional information* leave the TSP functionality and are sent to a digital output. The connection between the TSP functionality and the digital output are not in compliance with the Robustness Requirements. *Status: unencrypted, usable, marked.*
4. The content and the *additional information* leave the receiver via an unprotected digital output and are sent to a function that packages and encrypts the content and the *additional information* in such a manner that the content and *additional information* may only be understood by a consumer's cable STB whose manufacturer has entered into a license with the cable operator. The content and *additional information* are then sent to

another device that modulates the content and the *additional information* using QAM modulation. *Status: encrypted, unusable, marked.* The content is subject to the regulation, and the neither the cable operator's broadcasting equipment nor the consumer's receiving equipment are subject to the Requirements.

5. The content and *additional information* are sent via cable to the consumer's STB. The consumer's STB receives the QAM-modulated signal and conveys that signal by wire and circuit board to a demodulation function in the consumer's set-top box. Under the set-top box manufacturer's license to recover the demodulated content (see next paragraph), the connections to the rest of the set-top box are tamper-proof if they were subject to the Robustness Requirements. *Status: unusable, marked.* See Scenario 5 for further description of these signals once they arrive within a consumer's home.

Scenario 4: Over-The-Air Broadcast DTV Retransmitted By A Satellite System Headend



Scenario 4

Scenario 4 illustrates how professional DTH satellite system headend facilities could receive over-the-air DTV stations for insertion onto their digital earth station uplink facilities for transmission to set top boxes (STBs) as illustrated in Scenario 6 as an alternative to the direct off-air reception supported in the DTH STB in that scenario.

1. The signal is received by an 8-VSB receiver through an antenna from an over-the-air broadcast at a satellite system's head end (or perhaps via a fiber optic cable from the DTV station's ATSC encoder just prior to 8-VSB modulation). The signal is conveyed by wire and circuit board to a demodulation function. *Status of the content: unencrypted, unusable.*
2. A digital transport stream signal is obtained from the demodulation function. The demodulated content is then sent to a subsequent functional element (a transport stream processor or TSP) to discover the data structures necessary to find and recover the audio, video, and associated program data such as the Broadcast Flag, captioning and ratings information, as well as electronic program guide (EPG) data. The connection between the two functions is not tamper-proof in compliance with the Robustness Requirements. The satellite system operator has filed a written commitment with the Commission pursuant to Section X.2(c)(3)(C) of the Requirements, stating that it is a DTH satellite operator, allowing the satellite system operator to purchase the noncompliant receiver. *Status: unencrypted, usable, unscreened.*
3. The TSP will discover the data structures necessary to read the associated program data such as the Broadcast Flag, captioning and ratings information, as well as electronic program guide (EPG) data. The DTH service provider repackages this information from the ATSC format into a proprietary format for carriage to the consumer. In the course of processing, the EIT or PMT is checked for the rc_descriptor. If the rc_descriptor is present, the content is marked. If the rc_descriptor is not present, the content is unmarked. The stream processor creates *additional information* noting that the content

has been screened and found to be marked or unmarked. The content and the *additional information* are sent to a digital output. The connection between the stream processor functionality and the digital output are not in compliance with the Robustness Requirements. *Status: unencrypted, usable, screened, marked or unmarked.*

Note: Alternatively, DTH and Cable providers could elect to not screen the ATSC data stream containing the EIT and PMT and could instead pass this information directly to the STB or digital television for processing. However, this does not seem to be likely since most prefer to package the EPG information into their own customized interfaces.

4. The content and the *additional information* are received by a function that combines them in such a manner that they may only be understood by a consumer's DTH satellite set top box whose manufacturer has entered into a license with the satellite operator. The content and *additional information* are then sent to a device that modulates the content and the *additional information* using QPSK modulation for transmission to the satellite. *Status: unusable, marked.* The content is subject to the regulation, and the neither the cable operator's broadcasting equipment nor the consumer's receiving equipment are subject to the Requirements.
5. The content and *additional information* are sent via satellite to the consumer's set top box. The remainder of the content flow description is provided within the Scenario 6 section.

Scenario 5: Over-The-Air Broadcast DTV Content Received By A Cable Set Top Box (STB)



Scenario 5

Scenario 5 illustrates how over-the-air DTV could be provided by digital cable STBs which also contain built-in PVR functionality. The method by which the cable provider acquired the broadcast content is described in Scenario 3.

1. Encrypted content and additional information are sent via cable to the consumer's STB. The STB receives the QAM-modulated signal and conveys that signal by wire and circuit board to a demodulation function in the consumer's set-top box. Under the set-top box manufacturer's license to decrypt the demodulated content (see next paragraph), the connections to the rest of the set-top box are tamper-proof as if they were subject to the Robustness Requirements. *Status: encrypted, unusable, screened.*
2. At each output from the set-top box, the additional information is read to determine if the content was previously found to be marked or unmarked.
 - a. **Unmarked content:** The STB is constructed such that content that is unmarked may flow to any available output, and be recorded using any available recording method. The STB manufacturer's license need no longer protect the content, and the consumer is not technologically restricted from doing whatever he or she wants with the content, including making unlimited copies. *Status: unencrypted, usable.*
 - b. **Marked content:** Under the set-top box manufacturer's license to receive the content, the set-top box is constructed such that content that had been found to be marked may only flow to one of the outputs in Table 1. In this scenario, the STB has an **analog output** to a High-Definition TV display. After being output, the content is not subject to the regulation, nor to any licensing requirements. The television set does not have to comply with the Requirements. The consumer is not technologically restricted from doing whatever desired with the content, including making unlimited copies. *Status: unencrypted, usable.*

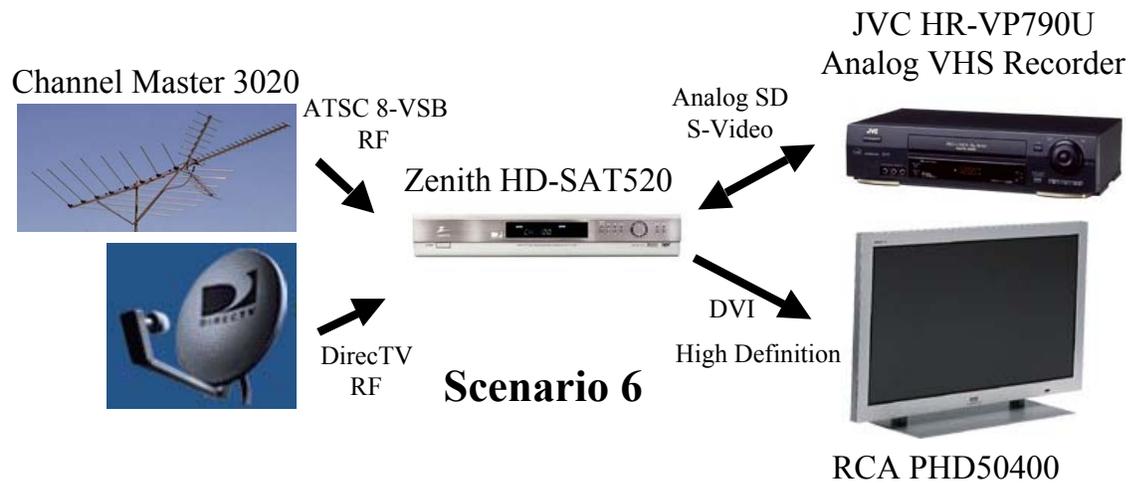
In this scenario, the cable receiver also has a personal video recorder (PVR) incorporated into the box that will digitally create a **bound recording** of the television signal for time-shifted viewing by the consumer. Under the terms of

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the STB manufacturer's license, in moving the content to the PVR function of the STB, the content must be encrypted or otherwise protected by the recorder such that it cannot be accessed by another device. *Status: encrypted, unusable, screened.*

When the content is played back from the PVR, the STB decrypts the signal, and again, at each output to the STB, it reads the additional information to determine if the content was found to be marked or unmarked.

Scenario 6: Over-The-Air Broadcast DTV Content Received By A Satellite System Set Top Box



Scenario 6 illustrates an extension in functionality from that described in Scenario 2 in that the set top box contains a receiver for tuning Direct To Home satellite services such as DirecTV or Echostar in addition to over-the-air ATSC DTV broadcasts.

1. The DTV signal is received by an 8-VSB digital terrestrial receiver through an antenna from an over-the-air broadcast from a terrestrial broadcaster. Additionally, signals are received from the DTH satellite broadcaster through a roof top dish antenna. The signal is conveyed by wire and circuit board to a demodulation function. *Status of the content: unencrypted, unusable.*
2. In either case, a digital transport stream signal is obtained from the demodulation function – either a regulated 8-VSB demodulator for digital terrestrial signals received from the off-air tuner, or an unregulated QPSK demodulator for signals received from the DTH tuner. The demodulated content is then sent to a subsequent functional element (a transport stream processor or TSP) to discover the data structures necessary to find and recover the audio, video, and associated program data such as the Broadcast Flag, captioning and ratings information, as well as electronic program guide (EPG) data. The connection between the functions must be tamper-proof in compliance with the Robustness Requirements. *Status: unencrypted, usable, unscreened*
3. In the course of transport stream processing performed on the terrestrial DTV signal, the EIT (Event Information Table containing program event information) or the PMT (Program Map Table, a structure within in the MPEG video stream) is checked for the rc_descriptor. If the rc_descriptor is found within the transport stream it means that the content is marked. The audio, video, and associated data content and an indication (as *additional information*) of the marked content status are sent to the rest of the combined receiver. The connections between the transport stream processor and the rest of the components of the digital television set must be tamper-proof in compliance with the

Robustness Requirements. *Status: unencrypted, usable, screened, marked.* Processing behavior of content received via the QPSK DTH demodulator is not regulated.

4. At each output from the set-top box, the *additional information* is read to determine if the content is marked. Under either the regulation, for content received via the terrestrial DTV signal, or the set-top box manufacturer's license to decrypt the content, for content received from the satellite broadcaster's signal, the set-top box is constructed such that marked content may only flow to one of the following outputs:

- (1) **Analog output.** The content leaves the set-top box via an analog output, such as component analog or an RF output, to an older-model VCR or analog television set. The content is not subject to the regulation, nor to any licensing requirements. The VCR or analog television set does not have to comply with the Requirements. The consumer is not technologically restricted from doing whatever he or she wants with the content, including making unlimited copies. *Status: unencrypted, usable.*

- (2) **Modulated output.** The content leaves the set-top box via a modulated output, such as an 8-VSB modulated output, and is sent to an 8-VSB receiver elsewhere in the household. (Such devices are not yet in existence, but may be in the future). Since the set-top box contains a modulated output, it is subject to the regulations for consumer modulators. Because the content was received and demodulated by the set-top box, the modulated output on the set-top box does not have to check for the Flag and ensure that it is not present. Once the content leaves the modulated output, it is no longer subject to the regulation. *Status: unencrypted, unusable, marked.* The other 8-VSB receiver *is* subject to the regulation, as a Covered Demodulator Product, and must follow the same procedures as the set-top box did, above.

- (3) **Protected digital output.** The content leaves the set-top box via a digital output protected by an Authorized Digital Output Protection Technology. An example of such an output might be a IEEE 1394 output protected by DTCP, assuming DTCP is admitted to Table A. Before sending the content, DTCP verifies that the receiving device ("sink") is an DTCP licensed sink. For example, the sink might be a PVR that has entered into an DTCP license. After verifying that the PVR is a licensed device, DTCP sends the content. *Status: encrypted, unusable, marked.* The PVR then decrypts the content using DTCP. *Status after reception by the sink: unencrypted, usable.* The content is not subject to the regulation, and the PVR is not subject to the Requirements; however, the PVR is required under the DTCP license to comply with similar conditions. Under the license, the PVR can only send the content to the outputs such as those listed here, and the PVR must be robust against tampering. The consumer may output the content from the PVR over any of the type of outputs allowed by the license, and may make an unlimited number of protected copies of such content using the PVR.

- (4) **Set-top box exercises sole control over the content.** The set-top box encrypts the content and sends it out an unprotected digital output. Only the set-top box has the key necessary to decrypt the content. The content is only usable if it is

returned to the same set-top box for decryption. For example, the set-top box may encrypt a program to be sent to a PVR. *Status after output: encrypted, unusable, marked.* The PVR at some later date plays back the encrypted recording to the set-top box. The set-top box decrypts the recording and sends the program over a protected digital output to a digital television set for display. The consumer is technologically restricted from making usable copies of the recording that will function with other products, and is technologically restricted from watching the recording on any products other than through set-top box.

(5) **Output for purpose of recording.** The content is encrypted by an Authorized Recording Method, then sent out a digital output to a compliant recorder, such as a recordable DVD drive. (See below for recordings.) *Status: encrypted, unusable.* The consumer is not technologically prevented from watching that recording as many times as he or she wants, or making an unlimited number of copies of the recording on compliant products.

5. If the set-top box has an integrated digital recorder, or if the content is output to a licensed product with digital recording capability under (3), above, or if the content is output to a compliant digital recorder under (5) above, the set-top box or licensed or compliant recorder will check the additional information to determine if the content is or was marked. Under the regulation, or the set-top box's decryption license, or under the digital output protection technology's decryption license, or under the recording method's encryption license, the recorder is constructed in such a way that, finding that the content is or was marked, it will make a digital recording in only one of two ways:

- (1) **Bound recording.** The content is encrypted or otherwise protected by the recorder such that it cannot be accessed by any other device, other than via one of the outputs described above. For example, the content is recorded by a PVR; the PVR encrypts the content with a key that only that PVR has. When the recording is played back, the PVR decrypts the content before sending it to the display device over one of the outputs above. *Status: encrypted, unusable.* The consumer may output the content from the PVR over any of the type of outputs allowed by the regulation, and is not technologically restricted from making an unlimited number of protected copies of such content after it has been output.

- (2) **Authorized Recording Method.** The content is recorded using an Authorized Recording Method. Such a recording may be to removable media, such as DVDs, if the Authorized Recording Method has been specifically approved for recording to removable media. An example of such a recording method might be CPRM, assuming CPRM is admitted to Table A and authorized for recording to removable media. If the set-top box has an integrated DVD recorder, then the content may be recorded to a DVD using CPRM. *Status: encrypted, unusable.* The recording may be played back on any CPRM-licensed DVD player. The recorded content is not subject to the regulation, and a DVD player accessing the recording is not subject to the Requirements; however, the DVD player is required under the CPRM license to comply with similar conditions. Under the license, the DVD player can only send the content to outputs such as those listed here, and the DVD player must be robust against tampering. The consumer may output the content from

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the DVD player over any of the type of outputs allowed by the license, and may make an unlimited number of protected copies of such content from the DVD player using one of the methods described above. A noncompliant player will not be able to access the recording.

Scenario 7: Over-The-Air Broadcast Content Received By An HP Windows™ XP Media Center Edition Computer



Scenario 7

In recent years, TV tuner cards have been able to be added to a Personal Computer (PC). New computer products are emerging that have tuners built-in, and the PC can act as a home server. PCs are modular devices into which the consumer can place many diverse devices manufactured by different companies. For this scenario, the computer has been integrated by a single manufacturer and the TV tuner has a companion program that will use the computer hard drive as a PVR. Assume also this computer has also been equipped by the consumer with a Pioneer DVR-105 for recording and reading DVDs and that it is connected to the Internet via a US Robotics V.92 Performance Pro Modem. There are many other possible attachments that will be described with examples below.

1. A radio frequency (RF) signal is received by an antenna connected to a tuner function that has been built into a personal computer designed to perform consumer oriented multimedia applications. The signal is conveyed by wire and circuit board from the tuner card to a demodulation function. *Status of the content: unencrypted, unusable.*
2. The demodulation function may be implemented in either hardware or a combination of hardware and software. In the latter situation, the connections between the hardware and software components must be tamper-proof in compliance with the Robustness Requirements. *Status: unencrypted, usable, unscreened.*
3. It is anticipated that computer tuner demodulation and Transport Stream Processing functions would screen the EIT or PMT so that V-chip, EPG, and other information could be displayed. In such case, handling would be similar to that of the previous scenarios: checking for a Marked or Unmarked indication at each output. However, the IT industry believes it is possible that the screening of the EIT and PMT may occur later in software, such that the demodulation function would need to prepare the content for transmission over a digital output to a Downstream Product. The demodulated content must be encrypted using a Robust Method that “provides technological protection against unauthorized redistribution of such content that is at least as effective as such technological protection provided by any one of the Authorized Digital Output Protection

Technologies and that is designed to ensure that such content may be accessed in usable form by another product only if such other product is a Downstream Product.” The Robust Method, however, does not itself have to be an Authorized Digital Output Protection Technology. Before sending the content over the digital output, the Robust Method verifies that the receiving device (“sink”) is a Downstream Product. Typically, the sink will be a the computer CPU running an application from a company that has entered into a license with the manufacturer of the demodulation software. After verifying that the device is a Downstream Product, the Robust Method sends the content. *Status: encrypted, unusable, unscreened.*

4. The Downstream Product must then decrypt the content using the Robust Method. *Status after reception by the sink: unencrypted, usable, unscreened.* As a Downstream Product, the device is subject to the regulation.
5. The Downstream Product must read the additional information accompanying the content and find that it is still unscreened. Under the regulation, at each output from the Downstream Product, the additional information is read to determine if the content is unscreened. The device is constructed such that unscreened content may only flow to another Downstream Product in the same fashion as described above, or to one of the following outputs (also listed in Table 1, above). *Status: unencrypted, usable, unscreened.*

- (1) **Analog output.** The content may leave the Downstream Product via an analog output, such as component analog or an RF output, to an older-model VCR or analog television set. The content is not subject to the regulation, nor to any licensing requirements. The VCR or analog television set does not have to comply with the Requirements. The consumer is not technologically restricted from doing whatever he or she wants with the content, including making unlimited copies. *Status: unencrypted, usable.*

- (2) **Modulated output.** The content may leave the Downstream Product via a modulated output, such as an 8-VSB modulated output, and is sent to an 8-VSB receiver elsewhere in the household. (Such devices are not yet in existence, but may be in the future). Since the Downstream Product contains a modulated output, it is subject to the regulations for consumer modulators and is not permitted to change the status of the Flag. Because the content was received in encrypted form by the Downstream Product, the modulated output on the Downstream Product does not have to check for the Flag and ensure that it is not present. Once the content leaves the modulated output, it is no longer subject to the regulation. *Status: unencrypted, unusable, unscreened.* The other 8-VSB receiver *is* subject to the regulation, as a Covered Demodulator Product, and must follow the same procedures as any other demodulator product.

- (3) **Protected digital output.** The content may leave the Downstream Product via a digital output protected by an Authorized Digital Output Protection Technology. An example of such an output might be a IEEE 1394 output protected by DTCP, assuming DTCP is admitted to Table A. Before sending the content, DTCP verifies that the receiving device (“sink”) is an DTCP licensed sink. For

example, the sink might be a stand-alone PVR that has entered into a DTCP license. After verifying that the PVR is a licensed device, DTCP sends the content. *Status: encrypted, unusable, unscreened.* The PVR then decrypts the content using DTCP. *Status after reception by the sink: unencrypted, usable, unscreened.* The content is not subject to the regulation, and the PVR is not subject to the Requirements; however, the PVR is required under the DTCP license to comply with similar conditions. Under the license, the PVR can only send the content to the outputs such as those listed here, and the PVR must be robust against tampering. The consumer may output the content from the PVR over any of the type of outputs allowed by the license, and may make an unlimited number of protected copies of such content using the PVR.

(4) **Downstream Product exercises sole control over the content.** The Downstream Product encrypts the content and sends it out an unprotected digital output. Only the Downstream Product has the key necessary to decrypt the content. The content is only usable if it is returned to the same Downstream Product for decryption. For example, the PC computer system may encrypt a program to be sent to a PVR. *Status after output: encrypted, unusable, unscreened.*

The PVR at some later date plays back the encrypted recording to the same Downstream Product. The Downstream Product decrypts the recording and sends the program over an authorized output to a display. The consumer is technologically restricted from directly making usable copies of the recording that will function with other products, and is technologically restricted from watching the recording on any products other than through this same Downstream Product. However, this same Downstream Product would be able to then pass the content to other authorized outputs that would provide copying capabilities.

(5) **Certain legacy DVI outputs:** In this scenario, the display is a legacy device connected via Digital Video Interface, or **DVI output**. The Downstream Product may move the content unprotected to this output, as long as the image has the visual equivalent of 480 by 720 pixels with an aspect ratio of 16:9 at 30 frames per second. *Status after output: unencrypted, usable.*

(6) **Bound recording.** The Downstream Product may also move the content to the hard disk drive, acting as a PVR, to digitally create a **bound recording**. In moving the content to the hard disk, the content must be encrypted or otherwise protected by the Downstream Product such that it cannot be accessed by another device. *Status: encrypted, unusable, unscreened.*

When the content is played back from the hard disk, the Downstream Product decrypts the signal, and again, at each output to the Downstream Product, it reads the additional information to determine if the content is unscreened or screened (marked or unmarked) *Status in this scenario: unencrypted, usable, unscreened.*

(7) **Authorized Recording Method.** This scenario also provides a DVD recorder. In this case, the content would be conveyed via a Robust Method as

described in step 3 to a second Downstream Product responsible for the DVD recording. *Status: encrypted, unusable, unscreened.*

This secondary Downstream Product would decrypt the content and prepare the content for recording on the DVD recorder using an **Authorized Recording Method**, such as CPRM. Before recording the content, the Downstream Product will verify that the recorder is a licensed CPRM device. After verification, the content is encrypted and sent to the DVD for recording. The consumer may make an unlimited number of recordings. The content is no longer subject to the regulation and the recorder is not subject to the Requirements. *Status: encrypted, unusable, unscreened.*

The recording may be played back on any CPRM-licensed DVD player. Such a DVD player is not subject to the Requirements; however, the DVD player is required under the CPRM license to comply with similar conditions. Under the license, the DVD player can only send the content to outputs such as those listed in Table 1, and the DVD player must be robust against tampering. A noncompliant player will not be able to access the recording.

6. In this scenario, the computer has come equipped with a modem for Internet access. The Downstream Product would not permit the unscreened content (or marked content) to be output via an unprotected digital modem that allows distribution outside the personal digital network environment.
7. Assuming the computer owner also had a device with personal content that could be connected to the computer, such as a digital video camera, the owner would be able to use the device and personal content as usual. The personal content would not be packaged with the broadcast ATSC transport stream, and therefore not have a Broadcast Flag associated with it. The personal content would enter the PC via an input function other than a terrestrial demodulator device. Thus the input function would not be subject to the Requirements and the content would never have any of the *additional information* as described above. The personal content would be able to be recorded to the DVD recorder, saved on the hard drive, displayed on the monitor, and output through the modem as desired by the owner.

**Scenario 8: Over-The-Air Broadcast Content Received By An HDTV Card
Within A Computer**



Scenario 8

Scenario 8 differs from Scenario 7 only in the fact that the consumer acts as a “system integrator” instead of a single manufacturer (HP in Scenario 7). The hardware and software are added to general purpose PCs by any consumer so inclined to take on the activities necessary to install, configure, and operate the system. This scenario is governed by Section X.6 of the Requirements. *See* Initial Joint Comments, Attachment B.

Device behavior responsibilities and obligations are not, however, changed from those illustrated in Scenario 7.