Requirements for the Protection of
Unencrypted Digital Terrestrial Broadcast Content
Against Unauthorized Redistribution

Joint Proposal from MPAA and 5C Companies
December 6, 2002

Scope

This document sets forth requirements to be imposed on certain products that demodulate unencrypted digital terrestrial broadcast content and certain other products that modulate content which could be sent to demodulators, in order to protect unencrypted digital terrestrial broadcast content against unauthorized redistribution (including unauthorized redistribution over the Internet), without permitting content whose provenance is unknown from being treated as unencrypted digital terrestrial broadcast content.

[X.] Requirements.

X.1 Definitions.

"8-VSB" means vestigial sideband modulation with 8 discrete amplitude levels, as described in ATSC Standard A/53.

"16-VSB" means vestigial sideband modulation with 16 discrete amplitude levels, as described in ATSC Standard A/53.

"64-QAM" means Quadrature Amplitude Modulation with a 64-point constellation, as described in "Digital Video Transmission Standard for Cable Television", ANSI/SCTE 07 2000.

"256-QAM" means Quadrature Amplitude Modulation with a 256-point constellation, as described in "Digital Video Transmission Standard for Cable Television", ANSI/SCTE 07 2000.

"Authorized Digital Output Protection Technology" means a technology listed on Table A, as such list may be amended from time to time pursuant to [regulations to be promulgated by the Commission concerning the authorization of digital output technologies].

"Authorized Recording Method" means a recording method listed on Table A, as such list may be amended from time to time pursuant to [regulations to be promulgated by the Commission concerning the authorization of recording technologies].

"Bona Fide Reseller" means a person regularly engaged, or about to become regularly engaged, in the lawful commercial enterprise of selling, reselling, manufacturing, or assembling Modulation Functions or Demodulation Functions, or products incorporating Modulation Functions or Demodulation Functions, in compliance with this subpart.

"Broadcast Flag" means the Redistribution Control descriptor (rc_descriptor()) described in ATSC Standard A/65A: Program and System Information Protocol for Terrestrial Broadcast and Cable, 31 May 2000, Amendment 3, 6 February 2002.

"Circumvention Devices" means devices or technologies that are designed and made available for the specific purpose of bypassing or circumventing the protection technologies used to meet the requirements set forth in this Section X.

"Computer Product" means a product that is designed for or permits the end user to install a wide variety of commercially available software applications thereon, such as a personal computer, handheld "Personal Digital Assistant" and the like, and further includes a subsystem of such a product, such as a graphics card.

"Covered Demodulator Product" means a product (whether a physical device, software or combination thereof) that is required under Sections X.2(a)(1) or X.2(b)(1) to comply with the Demodulator Compliance Requirements, and to be manufactured in accordance with the Demodulator Robustness Requirements.

"Covered Modulator Product" means a product (whether a physical device, software or combination thereof) that is required under Section X.13(a)(1) to comply with the Modulator Compliance Requirements, and to be manufactured in accordance with the Modulator Robustness Requirements.

"Demodulation Function" 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).

"Demodulator Compliance Requirements" means the requirements set out in Sections X.3 through X.6.

"Demodulator Robustness Requirements" means the requirements set out in Sections X.7 through X.12.

"Downstream Product" means a product (whether a physical device, software or combination thereof) that is capable of accessing in usable form[1] Unscreened Content or Marked Content[2] passed to such product via a Robust Method, where the manufacturer of such product has committed in writing in accordance with Section X.2(c) that such product will comply with the Demodulator Compliance Requirements and be manufactured in accordance with the Demodulator Robustness Requirements, such that such product shall be a Covered Demodulator Product.[3]

"EIT" means Event Information Table as defined in ATSC Standard A/65A (2000) Program and System Information Protocol for Terrestrial Broadcast and Cable.

"Hardware" means a physical device, including a component, that implements in a Covered Demodulator Product or Covered Modulator Product, as applicable, any of the content protection requirements set forth in the respective Demodulator Compliance Requirements or Modulator Compliance Requirements and that (i) does not include instructions or data other than such instructions or data that are permanently embedded in such product or (ii) includes instructions or data that are not permanently embedded in such product where such instructions or data have been customized for such product and such instructions or data are not accessible to the end user through the product.

"Marked Content" means, with respect to a Covered Demodulator Product, Unencrypted Digital Terrestrial Broadcast Content that such product has (a) received and demodulated using its Demodulation Function and for which such product has inspected either the EIT or PMT and determined the Broadcast Flag to be present or (b) where such product is a Downstream Product, received via a Robust Method[4] and accessed in usable form, and for which such product either inspected the EIT or PMT and determined the Broadcast Flag to be present or determined through information robustly conveyed with such content (via such Robust Method) that another Covered Demodulator Product had previously so screened such content and determined the Broadcast Flag to be present; provided, however, that, with respect to a Covered Demodulator Product, "Marked

[1] The fact that a stream containing Unscreened Content or Marked Content has not been altered following demodulation does not mean in and of itself that such content is not in "usable form".

[2] Note that it is only pursuant to Section X.6(a) that Marked Content may be passed from a Covered Demodulator Product using a Robust Method.

[3] Note that Downstream Products would be required under Section X.2 to comply with the Demodulator Compliance Requirements and Demodulator Robustness Requirements prior to being sold or distributed (i.e., a failure to comply with such requirements would be a violation of, and subject to enforcement by the Commission under, this subpart).

[4] See note 2 above.

Content" shall not include content that has been passed from such product pursuant to Section X.4(a)(1), X.4(a)(2), X.4(a)(3), X.4(a)(5), X.4(a)(6), or X.6(b).[5]

"Modulation Function" means a component, or set of components, that is designed to perform the function of generating and emitting 8-VSB, 16-VSB, 64-QAM or 256-QAM modulated signals (e.g., a modulation chip or modulation software).

"Modulator Compliance Requirements" means the requirements set out in Section X.14.

"Modulator Robustness Requirements" means the requirements set out in Sections X.15 through X.18.

"PMT" means Program Map Table as defined in ISO/IEC IS 13818-1:1 2000 (E), International Standard, MPEG-2 Systems.

"Robust Method" means, with respect to the passing of Unscreened Content or Marked Content from one product to another, a method that complies with Section X.10.

"Software" means the implementation in a Covered Demodulator Product or a Covered Modulator Product, as applicable, of any of the content protection requirements set forth in the respective Demodulator Compliance Requirements or Modulator Compliance Requirements through any computer program code consisting of instructions or data, other than such instructions or data that are included in Hardware.

"Transitory Image" means data that has been stored temporarily for the sole purpose of enabling a function not prohibited by this Section X but that (a) does not persist materially after such function has been performed and (b) is not stored in a way that permits copying or storing of such data for other purposes.

"Unencrypted Digital Terrestrial Broadcast Content" means audiovisual content contained in the ATSC Transport Stream broadcast by a digital television station in compliance with the digital broadcast television transmission standard set forth in 47 C.F.R. Section 73.682(d), without encrypting or otherwise making the content available through a technical means of conditional access, and includes such content when retransmitted in unencrypted digital form.

"Unknown Content" means, with respect to a Covered Modulator Product, any audiovisual content that such product has received in unencrypted form, other than

[5] Note: The fact that content *passed from* a Covered Demodulator Product pursuant to Sections X.4(a)(2) and X.4(a)(5) is not Marked Content with respect to that product does not remove any obligation on the part of Covered Demodulator Products that *receive* such content to treat such content as Marked Content.

audiovisual content that such product has received and demodulated using a Demodulation Function or that has been passed from such Covered Modulator Product.

"Unscreened Content" means, with respect to a Covered Demodulator Product, Unencrypted Digital Terrestrial Broadcast Content that such product either (a) received and demodulated using its Demodulation Function and for which such product has inspected neither the EIT nor the PMT for the Broadcast Flag or (b) where such product is a Downstream Product, received via a Robust Method and accessed in usable form, and for which such product has inspected neither the EIT nor the PMT for the Broadcast Flag and has not determined through information robustly conveyed with such content (via such Robust Method) that another Covered Demodulator Product had previously so screened such content and determined the Broadcast Flag to be present; provided, however, that, with respect to a Covered Demodulator Product, "Unscreened Content" shall not include content that has been passed from such product pursuant to Sections X.3(a)(1), X.3(a)(2), X.3(a)(3), X.3(a)(4), X.3(a)(6), X.3(a)(7), or X.6(b).[6]

"User Accessible Bus" means a data bus that is designed for end user upgrades or access, such as an implementation of a smartcard interface, PCMCIA, Cardbus, or PCI that has standard sockets or otherwise readily facilitates end user access. A "User Accessible Bus" does not include memory buses, CPU buses, or similar portions of a device's internal architecture that do not permit access to content in a form usable by end users.

X.2 Sale or Distribution of Demodulation Functions and Downstream Products.

(a) Demodulation Functions.

(1) No person[7] that manufactures in the United States or imports from any foreign country into the United States, a Demodulation Function shall sell or distribute in interstate commerce such Demodulation Function unless:

(A) at the time of such sale or distribution such Demodulation Function is, or is incorporated into, a product that complies with the Demodulator Compliance Requirements and was manufactured in accordance with the Demodulator Robustness Requirements; or

[6] Note: The fact that content *passed from* a Covered Demodulator Product pursuant to Sections X.3(a)(2), X.3(a)(4), and X.3(a)(6) is not Unscreened Content with respect to that product does not remove any obligation on the part of Covered Demodulator Products that *receive* such content to treat such content as Unscreened Content.

[7] "Person" shall be defined as in 47 U.S.C. § 153(32).

(B) such sale or distribution is to a person that has committed in writing pursuant to Section X.2(c) not to sell or distribute such Demodulation Function in the United States other than in accordance with Sections X.2(a)(1)(A) or X.2(a)(1)(B).

(2) No person shall manufacture in the United States, or import from any foreign country into the United States, a Demodulation Function for the purpose of sale or distribution in interstate commerce other than sale or distribution in interstate commerce in accordance with Sections X.2(a)(1)(A) or X.2(a)(1)(B).

(3) No person shall sell or distribute in interstate commerce a Covered Demodulator Product if: (A) the person has actual knowledge that the Covered Demodulator Product does not comply with the Demodulator Compliance Requirements and Demodulator Robustness Requirements; (B) the Covered Demodulator Product has been determined by the Commission or a court of competent jurisdiction not to comply with the Demodulator Compliance Requirements and Demodulator Robustness Requirements; or (C) the person has failed to expeditiously disclose to the Commission, upon request by the Commission, information that person may have in its possession identifying the source of the product in question.

(4) Paragraph X.2(a)(3) shall not apply to an individual person for the resale of a product that was manufactured prior to the effective date of this subpart or that initially was sold or distributed in compliance with this subpart.

(b) Downstream Products.

(1) No person shall manufacture in the United States, sell or distribute in interstate commerce, or import from any foreign country into the United States a Downstream Product unless, at the time of such manufacture, sale, distribution, or importation, such Downstream Product complies with the Compliance Requirements and was manufactured in accordance with the Robustness Requirements.

(2) Paragraph X.2(b)(1) shall not apply to an individual person for the resale of a Downstream Product that was manufactured prior to the effective date of this subpart or that initially was sold or distributed in compliance with this subpart.

(c) Written Commitments.

(1) A commitment in writing for a Downstream Product or to allow sale or distribution under Section X.2(a)(1)(B) shall be filed on a form prescribed by the Commission. The commitment shall be signed as provided in ___ and submitted to the Federal Communications Commission, [address].

(2) Among the information to be provided by a person filing a commitment in writing pursuant to this Section X.2(c) for a Downstream Product shall be a commitment that that the person is engaged, or about to become engaged, in the lawful commercial enterprise of manufacturing such Downstream Product, and that such product will comply with the Demodulator Compliance Requirements and be manufactured in accordance with the Demodulator Robustness Requirements.

(3) Among the information to be provided by a person filing a commitment in writing pursuant to this Section X.2(c) to allow sale or distribution under Section X.2(a)(1)(B) shall be a commitment that one of the following conditions is true:

(A) the person is a Bona Fide Reseller;

(B) the person is a licensed digital television broadcaster; or

(C) the person is a satellite broadcaster, cable television system operator, or other person engaged, or about to become engaged, in the lawful retransmission of Unencrypted Digital Terrestrial Broadcast Content pursuant to Section X.2(d) or X.2(e).

(4) It shall be a violation of this subpart for a person to sell or distribute a Demodulation Function pursuant to Section X.2(a)(1)(B) to any person that the person knows, or reasonably should know, does not meet any of the conditions set forth in Section X.2(c)(3).

(5) It shall be a violation of this subpart, enforceable by the Commission, for any person that has filed a written commitment pursuant to this Section X.2(c) to (A) in the case of such commitment under X.2(a)(1)(B), sell or distribute the Demodulation Function in the United States other than in accordance with Sections X.2(a)(1)(A) or X.2(a)(1)(B); or (B) in the case of such commitment for a Downstream Product, manufacture in the United States, sell or distribute in interstate commerce, or import from any foreign country into the United States the Downstream Product other than in compliance with Section X.2(b). To the extent that the filing of a written commitment pursuant to this Section X.2(c) creates rights between parties that may be enforced through private contractual remedies or third-party beneficiary rights, enforcement by the Commission will not abrogate those rights and remedies.

(6) The filing of a written commitment will be publicly announced in a timely manner by the Commission, and shall be available in accordance with Secs. 0.441 through 0.470 of this chapter.

(d) Encrypted Retransmission. Where a satellite broadcaster, cable television system operator, or any other person retransmits Unencrypted Digital Terrestrial Broadcast

Content in encrypted form, such retransmitter shall, upon demodulation of the 8-VSB, 16-VSB, 64-QAM or 256-QAM signal, inspect either the EIT or PMT for the Broadcast Flag, and if the Broadcast Flag is present (1) securely and robustly convey that information to the consumer product used to decrypt the retransmitter's signal information and (2) require that such consumer product, following such decryption, protect the content of such signal as if it were a Covered Demodulator Product receiving Marked Content.

(e) Unencrypted Retransmission. Where a satellite broadcaster, cable television system operator, or any other person retransmits Unencrypted Digital Terrestrial Broadcast Content in unencrypted form, such retransmitter shall, upon demodulation: (1) preserve the Broadcast Flag, if present, in both the EIT and PMT; and (2) use 8-VSB, 16-VSB, 64-QAM, or 256-QAM signal modulation for the retransmission.

X.3 Compliance Requirements for Covered Demodulator Products: Unscreened Content.[8]

(a) A Covered Demodulator Product shall not pass, or direct to be passed, Unscreened Content to any output except

(1) to an analog output;

(2) to an 8-VSB, 16-VSB, 64-QAM or 256-QAM modulated output, provided that such Covered Demodulator Product is compliant with Section X.14;

(3) to a digital output protected by an Authorized Digital Output Protection Technology that is authorized for use with Unscreened Content pursuant to Section X.19, in accordance with any obligations set out on Table A applicable to such Authorized Digital Output Protection Technology;

(4) where the stream containing such content has not been altered following demodulation and such Covered Demodulator Product outputs, or directs to be output, such content to a Downstream Product solely within the home or other, similar local environment, using a Robust Method;

(5) where such Covered Demodulator Product outputs, or directs to be output, such content to another product and such Covered Demodulator Product exercises sole control (such as by using a cryptographic protocol), in compliance with the

[8] No requirements or limitations are imposed by this Section X with respect to the output, recording, or other handling of content other than Unscreened Content, Marked Content, and Unknown Content.

Demodulator Robustness Requirements, over the access to such content in usable form in such other product;

(6) where such Covered Demodulator Product outputs, or directs to be output, such content for the purpose of making a recording of such content pursuant to Section X.3(b)(2), where such content is protected by the corresponding recording method[9]; or

(7) where such Covered Demodulator Product is incorporated into a Computer Product and passes, or directs to be passed, such content to an unprotected output operating in a mode compatible with the Digital Visual Interface (DVI) Rev. 1.0 Specification as an image having the visual equivalent of no more than (a) 350,000 pixels per frame (e.g. an image with resolution of 720 x 480 pixels for a 4:3 (non-square pixel) aspect ratio) and (b) 30 frames per second. Such an image may be attained by reducing resolution, such as by discarding, dithering or averaging pixels to obtain the specified value, and can be displayed using video processing techniques such as line doubling or sharpening to improve the perceived quality of the image.

(b) A Covered Demodulator Product shall not record or cause the recording of Unscreened Content in digital form unless such recording is made using one of the following methods:

(1) a method that effectively and uniquely associates such recording with a single Covered Demodulator Product (using a cryptographic protocol or other effective means) so that such recording cannot be accessed in usable form by another product except where the content of such recording is passed to another product as permitted under this Section X; or

(2) an Authorized Recording Method that is authorized for use with Unscreened Content pursuant to Section X.19, in accordance with any obligations set out in Table A applicable to such Authorized Recording Method (provided that for recordings made on removable media, only Authorized Recording Methods expressly identified on Table A for use in connection with removable media may be used).

This Section X.3(b) does not impose restrictions regarding the storage of Unscreened Content as a Transitory Image.

[9] For example, a protected recording made onto storage media located in an external drive, where the recorder first encrypts the content and then passes it to the drive via an output.

X.4 Compliance Requirements for Covered Demodulator Products: Marked Content.

(a) A Covered Demodulator Product shall not pass, or direct to be passed, Marked Content to any output except

(1) to an analog output;

(2) to an 8-VSB, 16-VSB, 64-QAM or 256-QAM modulated output, provided that such Covered Demodulator Product is compliant with Section X.14;

(3) to a digital output protected by an Authorized Digital Output Protection Technology, in accordance with any obligations set out on Table A applicable to such Authorized Digital Output Protection Technology;

(4) where such Covered Demodulator Product outputs, or directs to be output, such content to another product and such Covered Demodulator Product exercises sole control (such as by using a cryptographic protocol), in compliance with the Demodulator Robustness Requirements, over the access to such content in usable form in such other product;

(5) where such Covered Demodulator Product outputs, or directs to be output, such content for the purpose of making a recording of such content pursuant to Section X.4(b)(2), where such content is protected by the corresponding recording method[10]; or

(6) where such Covered Demodulator Product is incorporated into a Computer Product and passes, or directs to be passed, such content to an unprotected output operating in a mode compatible with the Digital Visual Interface (DVI) Rev. 1.0 Specification as an image having the visual equivalent of no more than (a) 350,000 pixels per frame (e.g., an image with resolution of 720 x 480 pixels for a 4:3 (non-square pixel) aspect ratio) and (b) 30 frames per second. Such an image may be attained by reducing resolution, such as by discarding, dithering or averaging pixels to obtain the specified value, and can be displayed using video processing techniques such as line doubling or sharpening to improve the perceived quality of the image.

[10] For example, a protected recording made onto storage media located in an external drive, where the recorder first encrypts the content and then passes it to the drive via an output.

(b) A Covered Demodulator Product shall not record or cause the recording of Marked Content in digital form unless such recording is made using one of the following methods:

(1) a method that effectively and uniquely associates such recording with a single Covered Demodulator Product (using a cryptographic protocol or other effective means) so that such recording cannot be accessed in usable form by another product except where the content of such recording is passed to another product as permitted under this Section X or

(2) an Authorized Recording Method, in accordance with any obligations set out in Table A applicable to such Authorized Recording Method (provided that for recordings made on removable media, only Authorized Recording Methods expressly identified on Table A for use in connection with removable media may be used).

This Section X.4(b) does not impose restrictions regarding the storage of Marked Content as a Transitory Image.

X.5 Compliance Requirements for Covered Demodulator Products: Audio. Except as otherwise provided in Sections X.3(a) or X.4(a), Covered Demodulator Products shall not output the audio portions of Unscreened Content or of Marked Content in digital form except in compressed audio format (such as AC3) or in Linear PCM format in which the transmitted information is sampled at no more than 48 kHz and no more than 16 bits.

X.6 Add-in Covered Demodulator Products.[11] Where a Covered Demodulator Product passes Unscreened Content or Marked Content from such Covered Demodulator Product to another product, other than where such Covered Demodulator Product passes, or directs to be passed, such content to an output (e.g., where a demodulator add-in card in a personal computer passes such content to an associated software application installed in the same computer), it shall so pass such content (a) using a Robust Method; or (b) protected by an Authorized Digital Output Protection Technology (which, in the case of Unscreened Content, is authorized for use with Unscreened Content pursuant to Section X.19), in accordance with any obligations set out on Table A applicable to such Authorized Digital Output Protection Technology. Neither Unscreened Content nor Marked Content may be so passed in unencrypted, compressed form via a User Accessible Bus.

[11] This section does not generally incorporate Downstream Products into Section X.4(a) or override the limitations of Section X.3(a)(4).

X.7 Robustness Requirements for Covered Demodulator Products: Construction.

(a) Covered Demodulator Products shall be manufactured in a manner clearly designed to effectively frustrate attempts to modify such products to defeat the Demodulator Compliance Requirements.

(b) Covered Demodulator Products shall not include:

(1) switches, buttons, jumpers or software equivalents thereof,

(2) specific traces that can be cut, or

(3) functions (including service menus and remote-control functions),

in each case by which the Demodulator Compliance Requirements can be defeated, or by which compressed unencrypted Marked Content or compressed unencrypted Unscreened Content in such Covered Demodulator Products can be exposed to output, interception, retransmission or copying, in each case other than as permitted under this Section X.[12,13]

(c) Covered Demodulator Products shall be manufactured in a manner that is clearly designed to effectively frustrate attempts to discover or reveal any secret keys or secret algorithms used to meet the requirements set forth in the Demodulator Compliance Requirements.

X.8 Robustness Requirements for Covered Demodulator Products: Data Paths. Within a Covered Demodulator Product, neither Unscreened Content nor Marked Content shall be present on any User Accessible Bus in unencrypted, compressed form.

(a) Uncompressed Content. During a petition opportunity that the Commission may designate, an interested person may petition the Commission to initiate a Notice of Inquiry to determine whether it is technically feasible and commercially reasonable to require that Unscreened Content and Marked Content when transmitted over any User Accessible Bus in uncompressed digital form be made reasonably secure from unauthorized interception by using means that meet the standards set forth in Section X.11. Such petition shall include evidence that such an inquiry is warranted in light of generally available technologies and existing commercial circumstances. Should the

[12] See Section X.8(a). It is anticipated that if the Demodulator Robustness Requirements are modified in the future to require protection of uncompressed data on a User Accessible Bus, the requirements of Section X.7(b) would also then be modified to apply to uncompressed unencrypted content.

[13] For avoidance of doubt, the provisions of Section X.7(b) prohibit inclusion of such means by which such defeating or exposure can occur through removal of the Broadcast Flag.

Commission, based on such evidence and on consultation with affected industries, proceed with such Notice of Inquiry and thereby determine that requiring such protection at such level is technically feasible and commercially reasonable, the Commission may, pursuant to a Notice of Proposed Rulemaking, revise these Demodulator Robustness Requirements to so require. The Commission will consider in its analysis: the general availability of relevant technologies, cost of implementation, effectiveness of any solutions, availability of alternative solutions, intellectual property licensing issues, consistency with requirements of other content protection systems, likely ability of manufacturers of Covered Demodulator Products to satisfy the Demodulator Robustness Requirements, and normal design cycles for such products. The Commission will exercise its discretion to limit the frequency of such Notices of Proposed Rulemaking.

X.9 Methods of Making Functions in Covered Demodulator Products Robust. Covered Demodulator Products shall be manufactured using at least the following techniques in a manner that is clearly designed to effectively frustrate attempts to defeat the content protection requirements set forth below.

(a) Distributed Functions. Where compressed Unscreened Content or compressed Marked Content is delivered from one portion of the Covered Demodulator Product to another portion of such Covered Demodulator Product, whether among integrated circuits, software modules, a combination thereof, or otherwise, such portions shall be designed and manufactured in a manner associated and otherwise integrated with each other such that such Unscreened Content or Marked Content, as the case may be, in any usable form flowing between such portions of such Covered Demodulator Product shall be reasonably secure from being intercepted or copied except as permitted under the Demodulator Compliance Requirements.

(b) Software. Without limiting the requirements of Sections X.7 and X.8, portions of a Covered Demodulator Product that implement in Software the content protection requirements set forth in the Demodulator Compliance Requirements shall:

(1) Comply with Section X.7(c) by a reasonable method including but not limited to: encryption, execution of a portion of the implementation in ring zero or supervisor mode (i.e. in kernel mode), and/or embodiment in a secure physical implementation; and, in addition, using techniques of obfuscation clearly designed to effectively disguise and hamper attempts to discover the approaches used.

(2) Be designed so as to perform or ensure checking of the integrity of its component parts such that unauthorized modifications will be expected to result in a failure of the implementation to provide access to unencrypted Unscreened Content or unencrypted Marked Content. For purposes of this Section X.9(b)(2), a "modification" includes any change in, or disturbance or invasion of, features or characteristics, or interruption of processing, relevant to Sections X.7 and X.8. This

Section X.9(b)(2) requires at a minimum the use of signed code or more robust means of "tagging" operating throughout the code. For purposes of this Section X.9(b), "signed code" means a method of achieving trusted distribution of Software by using public key cryptography, keyed hash, or other means at least as effective, to form a digital signature over Software such that its authenticity and integrity can be verified.

(c) Hardware. Without limiting the requirements of Sections X.7 and X.8, the portions of a Covered Demodulator Product that implement in Hardware the content protection requirements set forth in the Demodulator Compliance Requirements shall:

(1) Comply with Section X.7(c) by any reasonable method including but not limited to (x) embedding any secret keys or secret cryptographic algorithms used to meet the content protection requirements set forth in the Demodulator Compliance Requirements in silicon circuitry or firmware that cannot reasonably be read or (y) employing the techniques described above for Software.

(2) Be designed such that attempts to remove, replace, or reprogram Hardware elements in a way that would compromise the content protection requirements set forth in the Demodulator Compliance Requirements in Covered Demodulator Products would pose a serious risk of rendering the Covered Demodulator Product unable to receive, demodulate, or decode Unencrypted Digital Terrestrial Broadcast Content. By way of example, a component that is soldered rather than socketed, or affixed with epoxy, may be appropriate for this means.

(d) Hybrid. The interfaces between Hardware and Software portions of a Covered Demodulator Product shall be designed so that the Hardware portions comply with the level of protection that would be provided by a pure Hardware implementation, and the Software portions comply with the level of protection that would be provided by a pure Software implementation.

X.10 Robustness Requirements for Covered Demodulator Products: Robust Methods. Where a Covered Demodulator Product passes, or directs to be passed, Unscreened Content or Marked Content from such Covered Demodulator Product to another product pursuant to Section X.6(a), it shall do so using a method designed to ensure that such content, in any usable form, shall be reasonably secure from being intercepted, redistributed or copied when being so passed to such other product. Where a Covered Demodulator Product passes, or directs to be passed, Unscreened Content to an output pursuant to Section X.3(a)(4), it shall do so using a 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.

X.11 Robustness Requirements for Covered Demodulator Products: Level of Protection. The content protection requirements set forth in the Demodulator Compliance Requirements and the requirements set forth in Sections X.7(c) and X.8 shall be implemented in a reasonable method so that they:

(a) Cannot be defeated or circumvented merely by using general-purpose tools or equipment that are widely available at a reasonable price, such as screwdrivers, jumpers, clips and soldering irons, or using specialized electronic tools or specialized software tools that are widely available at a reasonable price, such as EEPROM readers and writers, debuggers or decompilers, other than Circumvention Devices; and

(b) Can only with difficulty be defeated or circumvented using professional tools or equipment, such as logic analyzers, chip disassembly systems, or in-circuit emulators or any other tools, equipment, methods, or techniques not described in Section X.11(a) such as would be used primarily by persons of professional skill and training, but not including professional tools or equipment that are made available only on the basis of a non-disclosure agreement or Circumvention Devices.

X.12 Robustness Requirements for Covered Demodulator Products: Advance of Technology. Although an implementation of a Covered Demodulator Product when designed and first shipped may meet the above standards, subsequent circumstances may arise which, had they existed at the time of design of a particular Covered Demodulator Product, would have caused such products to fail to comply with these Demodulator Robustness Requirements ("New Circumstances"). If a manufacturer of a Covered Demodulator Product has actual notice or actual knowledge of New Circumstances that relate to the manufacturer's specific implementation of a Covered Demodulator Product (hereinafter referred to as "Notice"), then within 18 months after Notice such manufacturer shall cease distribution of such Covered Demodulator Product and shall only distribute Covered Demodulator Products that are compliant with the Demodulator Robustness Requirements in view of the then-current circumstances.

X.13 Sale or Distribution of Modulation Functions.

(a) Modulation Functions.

(1) No person[14] that manufactures in the United States or imports from any foreign country into the United States, a Modulation Function shall sell or distribute in interstate commerce such Modulation Function unless:

(A) at the time of such sale or distribution such Modulation Function is, or is incorporated into, a product that complies with the Modulator Compliance Requirements and was manufactured in accordance with the Modulator Robustness Requirements; or

(B) such sale or distribution is to a person that has committed in writing pursuant to Section X.13(b) not to sell or distribute such Modulation Function in the United States other than in accordance with Sections X.13(a)(1)(A) or X.13(a)(1)(B).

(2) No person shall manufacture in the United States, or import from any foreign country into the United States, a Modulation Function for the purpose of sale or distribution in interstate commerce other than sale or distribution in interstate commerce in accordance with Sections X.13(a)(1)(A) or X.13(a)(1)(B).

(3) No person shall sell or distribute in interstate commerce a Covered Modulator Product if: (A) the person has actual knowledge that the Covered Modulator Product does not comply with the Modulator Compliance Requirements and Modulator Robustness Requirements; (B) the Covered Modulator Product has been determined by the Commission or a court of competent jurisdiction not to comply with the Modulator Compliance Requirements and Modulator Robustness Requirements; or (C) the person has failed to expeditiously disclose to the Commission, upon request by the Commission, information that person may have in its possession identifying the source of the product in question.

(4) Section X.13(a)(3) shall not apply to an individual person for the resale of a product that was manufactured prior to the effective date of this subpart or that initially was sold or distributed in compliance with this subpart.

(b) Written Commitments.

(1) A commitment in writing to allow sale or distribution under Section X.13(a)(1)(B) shall be filed on a form prescribed by the Commission. The commitment shall be signed as provided in ___ and submitted to the Federal Communications Commission, [address].

[14] "Person" shall be defined as in 47 U.S.C. § 153(32).

(2) Among the information to be provided by a person filing a commitment in writing pursuant to this Section X.13(b) to allow sale or distribution under Section X.2(a)(1)(B) shall be a commitment that one of the following conditions is true:

(A) the person is a Bona Fide Reseller;

(B) the person is a licensed digital television broadcaster; or

(C) the person is a satellite broadcaster or cable television system operator.

(3) It shall be a violation of this subpart for a person to sell or distribute a Modulation Function pursuant to Section X.13(a)(1)(B) to any person that the person knows, or reasonably should know, does not meet any of the conditions set forth in Section X.13(b)(2).

(4) It shall be a violation of this subpart, enforceable by the Commission, for any person that has filed a written commitment pursuant to this Section X.13(b) to sell or distribute the Modulation Function in the United States other than in accordance with Sections X.13(a)(1)(A) or X.13(a)(1)(B). To the extent that the filing of a written commitment pursuant to this Section X.13(b) creates rights between parties that may be enforced through private contractual remedies or third-party beneficiary rights, enforcement by the Commission will not abrogate those rights and remedies.

(5) The filing of a written commitment will be publicly announced in a timely manner by the Commission, and shall be available in accordance with Secs. 0.441 through 0.470 of this chapter.

X.14 Compliance Requirements for Covered Modulator Products.

(a) A Covered Modulator Product shall not pass, or direct to be passed, Unknown Content to an 8-VSB, 16-VSB, 64-QAM or 256-QAM modulated output unless it first inspects the EIT and PMT and determines that the Broadcast Flag is not present in such Unknown Content.

(b) A Covered Modulator Product shall not insert the Broadcast Flag into any content.

(c) For the avoidance of doubt, a product shall not be subject to this Section X.14 if and to the extent:

(1) such product is not capable of receiving and modulating Unknown Content; or

(2) the Modulation Function of such product merely:

(A) transcodes a signal from VSB to QAM or from QAM to VSB;

(B) changes the physical channel; or

(C) makes other changes to the signal not affecting the presence or absence of the Broadcast Flag or any other access control or copyright management information;

in each case, regardless of whether or not corresponding changes are made to the PSIP (if present).

X.15 Robustness Requirements for Covered Modulator Products: Construction

(a) Covered Modulator Products shall be manufactured in a manner clearly designed to effectively frustrate attempts to modify such Covered Modulator Products to defeat the Modulator Compliance Requirements.

(b) Covered Modulator Products shall not include:

(1) switches, buttons, jumpers or software equivalents thereof,

(2) specific traces that can be cut, or

(3) functions (including service menus and remote-control functions),

in each case by which the Modulator Compliance Requirements can be defeated.

X.16 Robustness Requirements for Covered Modulator Products: Methods of Making Functions Robust. Covered Modulator Products shall be manufactured using at least the following techniques in a manner that is clearly designed to effectively frustrate attempts to defeat the content protection requirements set forth below.

(a) Software. Without limiting the requirements of Section X.15, portions of a Covered Modulator Product that implement in Software the content protection requirements set forth in the Modulator Compliance Requirements shall be designed so as to perform or ensure checking of the integrity of its component parts such that unauthorized modifications will be expected to result in a failure of the implementation to provide an 8-VSB, 16-VSB, 64-QAM or 256-QAM modulated output of Unknown Content. For purposes of this Section X.16(a), a "modification" includes any change in, or disturbance or invasion of, features or characteristics, or interruption of processing, relevant to Section X.15. This Section X.16(a) requires at a minimum the use of signed code or more robust means of "tagging" operating throughout the code. For purposes of this Section X.16(a), "signed code" means a method of achieving trusted distribution of Software by using public key cryptography, keyed hash, or other means at least as

effective, to form a digital signature over Software such that its authenticity and integrity can be verified.

(b) Hardware. Without limiting the requirements of Section X.15, the portions of a Covered Modulator Product that implement in Hardware the content protection requirements set forth in the Modulator Compliance Requirements shall be designed such that attempts to remove, replace, or reprogram Hardware elements in a way that would compromise the content protection requirements set forth in the Modulator Compliance Requirements in Covered Modulator Products would pose a serious risk of rendering the Covered Modulator Product unable to receive or modulate Unknown Content. By way of example, a component that is soldered rather than socketed, or affixed with epoxy, may be appropriate for this means.

(c) Hybrid. The interfaces between Hardware and Software portions of a Covered Modulator Product shall be designed so that the Hardware portions comply with the level of protection that would be provided by a pure Hardware implementation, and the Software portions comply with the level of protection that would be provided by a pure Software implementation.

X.17 Robustness Requirements for Covered Modulator Products: Level of Protection. The content protection requirements set forth in the Modulator Compliance Requirements shall be implemented in a reasonable method so that they:

(a) Cannot be defeated or circumvented merely by using general-purpose tools or equipment that are widely available at a reasonable price, such as screwdrivers, jumpers, clips and soldering irons, or using specialized electronic tools or specialized software tools that are widely available at a reasonable price, such as EEPROM readers and writers, debuggers or decompilers, other than Circumvention Devices; and

(b) Can only with difficulty be defeated or circumvented using professional tools or equipment, such as logic analyzers, chip disassembly systems, or in-circuit emulators or any other tools, equipment, methods, or techniques not described in Section X.17(a) such as would be used primarily by persons of professional skill and training, but not including professional tools or equipment that are made available only on the basis of a non-disclosure agreement or Circumvention Devices.

X.18 Robustness Requirements for Covered Modulator Products: Advance of Technology. Although an implementation of a Covered Modulator Product when designed and first shipped may meet the above standards, subsequent circumstances may arise which, had they existed at the time of design of a particular Covered Modulator Product, would have caused such products to fail to comply with these Modulator Robustness Requirements ("New Circumstances"). If a manufacturer of a Covered Modulator Product has actual notice or actual knowledge of New Circumstances that

relate to the manufacturer's specific implementation of a Covered Modulator Product (hereinafter referred to as "Notice"), then within eighteen (18) months after Notice such manufacturer shall cease distribution of such Covered Modulator Product and shall only distribute Covered Modulator Products that are compliant with the Modulator Robustness Requirements in view of the then-current circumstances.

X.19 Authorization for Use With Unscreened Content. In order to be authorized for use with Unscreened Content, an Authorized Digital Output Protection Technology or Authorized Recording Method must, in addition to meeting other applicable criteria, further either:

(1) protect Unscreened Content in a manner that prohibits its digital recording (other than temporary storage solely for the purpose of enabling immediate or delayed display) unless and until the EIT or PMT for content contained in a stream that has not been altered following demodulation is inspected for the Broadcast Flag, in which case:

(A) if the Broadcast Flag is determined to be present, the content shall thenceforth be treated in the same manner as if it had been passed from a Covered Demodulator Product protected by such Authorized Digital Output Protection Technology (pursuant to X.4(a)(3) or X.6(b)), or recorded using such Authorized Recording Method (pursuant to X.4(b)(2)), as Marked Content; and

(B) if the Broadcast Flag is determined not to be present, no protections are thenceforth required to apply; or

(2) protect Unscreened Content so that such content may be accessed in usable form by another product only if such other product protects such content in accordance with the Compliance and Robustness Requirements applicable to Unscreened Content, as if it were a Covered Demodulator Product.