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Emergency Alert Messaging for Cable

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Emergency Alert Messaging for Cable

1 Scope

This standard defines an Emergency Alert signaling method for use by cable TV systems to signal emergencies to digital receiving devices that are offered for retail sale. Such devices include digital set-top boxes that are sold to consumers at retail, digital TV receivers, and digital video recorders.

The Emergency Alert signaling (EAS) scheme defined in this standard allows a cable operator to disseminate emergency alert information related to state and local-level emergencies and warnings in an efficient way, while minimizing disruption to programming. While it is possible for a cable operator to comply with EAS requirements by simply replacing the source signal for all programs with an emergency information channel, such switching is disruptive to viewing, is overly intrusive for many kinds of local warnings and is overly-complex for the cable operator to implement in a digital cable environment where each transport stream may carry many programs that would have to be individually interrupted. Based on the priority level of the alert, the Emergency Alert message may instruct the receiving device to force-tune to a designated emergency broadcast channel.

Section 5 of this standard defines the syntax of the Emergency Alert message and related descriptors. This message is in the form of a standard MPEG-2 table and, when necessary, is delivered in-band on cable transport streams that carry one or more programs in-the-clear. Receiving devices without Point Of Deployment (POD)¹ modules in place process such messages in accordance with requirements described in Section 7 of this standard. For programs that are scrambled on a cable system, the Emergency Alert message is delivered to the POD module using the cable system's forward data channel. The POD module processes the message as necessary and delivers it to the receiving device out-of-band. As used in this standard, "out-of-band" refers to the Extended Channel interface defined in ANSI/SCTE 28 2004 [5]. As delivered to the receiving device by the POD module, the Emergency Alert message is in the form of an MPEG-2 table as defined in Section 5 of this standard. The receiving device then processes the message in accordance with Section 7 of this standard.

The behavior of receiving devices in response to user actions, such as channel changes or accessing on-screen displays, where such user actions relate to acquisition and processing of Emergency Alert messages, is out of scope of this standard.

2 Overview

Emergency message support for receiving devices involves the following elements:

- a) A signaling scheme to identify the presence of an Emergency Alert.
- b) The start time and expected duration of the alert event.²
- c) A textual description of the emergency alert.
- d) An indication of the availability and location of the "details" channel, an audio/video service pertaining to the alert.
- e) An indication whether the event is of sufficient importance that tuning to the details channel shall be done unconditionally.
- f) A pointer to an optional audio channel that can be used to replace the audio of the current service for the duration of the Emergency Alert message.

This standard defines a **cable_emergency_alert()** message in the form of an MPEG-2 **private_section()** (per MPEG-2 Systems [2] Table 2-30), compatible with MPEG-2 transport.

3 References

3.1 Normative References

The following standards contain provisions that, through reference in this text, constitute normative provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and

¹ The Point Of Deployment module is also known as a CableCARD™ device.

² For example, a flood warning might start at 4pm and last for 8 hours.

parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed in Section 3.1.1.

3.1.1 Normative Reference List

1. ATSC A/65C, Program and System Information Protocol for Terrestrial Broadcast and Cable, with Amendment No. 1, January 2006
2. ITU-T Rec. H.222.0 | ISO/IEC 13818-1:2000, Information Technology—Generic coding of moving pictures and associated audio information - Part 1: Systems
3. FCC Rules, 47 C.F.R. Part 11, Emergency Alert System (EAS) (revised as of 11/10/2005)
4. FIPS PUB 6-4, Counties and Equivalent Entities of the United States, Its Possessions, and Associated Areas, 8/31/90 (with minor editorial corrections January 2005)
5. ANSI/SCTE 28 2004, HOST-POD Interface Standard
6. CEA-542-B, Cable Television Channel Identification Plan, July 2003
7. ISO/IEC 13818-6:1998—Information technology—Generic coding of moving pictures and associated audio information -- Part 6: Extensions for DSM-CC
8. ANSI/SCTE 90-1 2005, SCTE Application Platform Standard OCAP 1.0 Profile
9. ANSI/SCTE 106 2005, DOCSIS Set-Top Gateway (DSG) Specification
10. ANSI/SCTE 55-1 2002, Digital Broadband Delivery System: Out Of Band Transport Part 1: Mode A
11. ANSI/SCTE 55-2 2002, Digital Broadband Delivery System: Out Of Band Transport Part 2: Mode B
12. IEEE 802-2001/A2, Standard for Local and Metropolitan Area Networks: Overview and Architecture, March 2004

3.1.2 Normative Reference Acquisition

ATSC Standards:

- Advanced Television Systems Committee (ATSC), 1750 K Street N.W., Suite 1200, Washington, DC 20006; Phone 202-872-9160; Fax 202-872-9161; Internet <http://www.atsc.org/>

IEC Standards:

- Global Engineering Documents, World Headquarters, 15 Inverness Way East, Englewood, CO USA 80112-5776; Phone 800-854-7179; Fax 303-397-2740; Internet <http://global.ihs.com>; Email global@ihs.com
- IEC Central Office, 3, rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland; Phone +41 22 919 02 11; Fax +41 22 919 03 00; Internet <http://www.iec.ch>; Email pubinfor@iec.ch

ITU Standards:

- International Telecommunication Union, Place des Nations, CH-1211 Geneva 20, Switzerland; Phone +41 22 730 5111; Fax +41 22 733 7256; Internet <http://www.itu.ch/publications/bookstore.html> Email itumail@itu.int

FCC Rules

- U.S. Code of Federal Regulations (C.F.R.), U.S. Government Printing Office, Washington, D.C. 2040; <http://www.fcc.gov/wtb/rules.html>

FIPS Standards:

- National Institute of Standards and Technology; <http://www.itl.nist.gov/fipspubs/>

SCTE Standards:

- Society of Cable Telecommunications Engineers (SCTE), 140 Philips Road, Exton PA 19341; Phone 800-542-5040; Fax 610-363-5898; Internet <http://www.scte.org>; Email standards@scte.org

IEEE Standards:

- Global Engineering Documents, World Headquarters, 15 Inverness Way East, Englewood, CO USA 80112-5776; Phone 800-854-7179; Fax 303-397-2740; Internet <http://global.ihs.com>; Email global@ihs.com

3.2 Informative References

3.2.1 Informative Reference List

13. ATSC A/53E with Amendment No. 1, Digital Television Standard , April 2006
14. ANSI/SCTE 65 2002, Service Information Delivered Out-of-Band for Digital Cable Television
15. IEEE OUI Registration Authority

3.2.2 Informative Reference Acquisition

ATSC Standards:

- Advanced Television Systems Committee (ATSC), 1750 K Street N.W., Suite 1200, Washington, DC 20006; Phone 202-872-9160; Fax 202-872-9161; Internet <http://www.atsc.org/>

IEEE OUI Registration Authority:

- <http://standards.ieee.org/regauth/oui/index.shtml>

SCTE Standards:

- Society of Cable Telecommunications Engineers (SCTE), 140 Philips Road, Exton PA 19341; Phone 800-542-5040; Fax 610-363-5898; Internet <http://www.scte.org>; Email standards@scte.org

4 Compliance Notation

As used in this standard, “*shall*” denotes a mandatory provision of the standard. “*Should*” denotes a provision that is recommended but not mandatory. “*May*” denotes a feature, whose presence does not preclude compliance, that may or may not be present at the option of the implementer. “*Optional*” denotes items that may or may not be present in a compliant implementation.

5 Emergency Alert Message (Normative)

The **cable_emergency_alert()** message shall be delivered to the receiving device in packets identified with the **SI_base_PID** (per SCTE 28 [5] Section 8.9.1) value. For transport streams carrying one or more programs in the clear, packets identified by PID 0x1FFB shall be used. For out-of-band use on the Extended Channel, **SI_base_PID** value 0x1FFC shall be used. The syntax of the **cable_emergency_alert()** message that shall be used is defined in Table 1. Acronyms uimbsf, bsbf, and rpchf are as defined in ISO/IEC 13818-1 [2] Section 2.2.6.

The MPEG-2 **table_ID** for this message is 0xD8. Refer to ISO/IEC 13818-1 [2] MPEG-2 systems for a description of the fields common to the MPEG-2 private section syntax.

The **cable_emergency_alert()** message is limited to 4096 bytes maximum length, which means that the **section_length** field may have a maximum value of 4093 decimal.

table_ID—This is an 8-bit field which shall be set to 0xD8, identifying this table as the **cable_emergency_alert()** message.

section_syntax_indicator—This 1-bit field shall be set to ‘1’. It denotes that the table section follows the generic MPEG-2 section syntax beyond the **section_length** field

zero—This 1-bit field shall be set to ‘0’.

Syntax	Bits	Description
cable_emergency_alert() {		
table_ID	8	uimsbf value 0xD8
section_syntax_indicator	1	'1'
zero	1	'0'
reserved	2	'11'
section_length	12	uimsbf
table_id_extension	16	uimsbf '0x0000'
reserved	2	'11'
sequence_number	5	uimsbf
current_next_indicator	1	bslbf
section_number	8	uimsbf
last_section_number	8	uimsbf
protocol_version	8	uimsbf
EAS_event_ID	16	uimsbf
EAS_originator_code	24	uimsbf three ASCII characters
EAS_event_code_length	8	uimsbf
EAS_event_code	var	uimsbf
nature_of_activation_text_length	8	uimsbf
nature_of_activation_text()	var	uimsbf
alert_message_time_remaining	8	uimsbf seconds range 0..120
event_start_time	32	uimsbf
event_duration	16	uimsbf minutes range 15..6000
reserved	12	bslbf
alert_priority	4	uimsbf
details_OOB_source_ID	16	uimsbf
reserved	6	'111111'
details_major_channel_number	10	uimsbf
reserved	6	'111111'
details_minor_channel_number	10	uimsbf
audio_OOB_source_ID	16	uimsbf
alert_text_length	16	uimsbf
alert_text()	var	Per ATSC A/65C [1], Sec. 6.10
location_code_count	8	uimsbf range 1..31
for (i=0; i<location_code_count; i++) {		
state_code	8	uimsbf range 0..99
county_subdivision	4	uimsbf range 0..9
reserved	2	'11'
county_code	10	uimsbf range 0..999
}		
exception_count	8	uimsbf
for (i=0; i<exception_count; i++) {		
in_band_reference	1	bslbf
reserved	7	'1111111'
if (in_band_reference) {		
reserved	6	'111111'
exception_major_channel_number	10	uimsbf
reserved	6	'111111'
exception_minor_channel_number	10	uimsbf
}		
else {		
reserved	16	bslsbf
exception_OOB_source_ID	16	uimsbf
}		
}		
reserved	6	'111111'
descriptors_length	10	uimsbf
for (i=0; i<N; i++) {		
descriptor()	var	Optional
}		
CRC_32	32	rpchof
}		

Table 1 Emergency Alert Message Format

reserved—Fields in this standard marked **reserved** shall not be assigned by the creator of the message, but shall be available for future use. Receiving devices are expected to disregard reserved fields for which no definition exists that is known to that unit. Each bit in the fields marked **reserved** shall be set to one until such time as they are defined and supported.

section_length—12-bit field specifying the number of remaining bytes in this section immediately following the **section_length** field up to the end of the section. The value of the **section_length** shall be no larger than 4093.

table_id_extension—This 16-bit field shall be set to zero (0x0000).

sequence_number—This 5-bit field is the sequence number of this **cable_emergency_alert()** message. The **sequence_number** shall be incremented by 1 (modulo 32), when any change occurs in the information carried in the **cable_emergency_alert()** message. Receiving devices process the **sequence_number** in order to detect and discard duplicate transmissions. Duplicates of any alert may be sent to overcome possible message loss due to channel noise.

When the last-used **sequence_number** is known, generating equipment shall increment **sequence_number** by one (modulo 32) when any data in the alert message changes. In case the last-used **sequence_number** is unknown (which can occur if a new piece of equipment is brought on line), generating equipment shall send an Emergency Alert with **alert_priority** zero to establish a new **sequence_number** in all receiving devices before sending any actual alerts.

current_next_indicator—This 1-bit indicator shall always be set to ‘1’ indicating that the table sent is always currently applicable.

section_number—The value of this 8-bit field shall always be 0x00 (this table shall be at most one section long).

last_section_number—The value of this 8-bit field shall always be 0x00.

protocol_version—An 8-bit unsigned integer field whose function is to allow, in the future, this table type to carry parameters that may be structured differently than those defined in the current protocol. At present, the only valid value for **protocol_version** is zero.

EAS_event_ID—A 16-bit value that shall identify the particular Emergency Alert event. Each time a new EAS message is distributed throughout the cable system, a new **EAS_event_ID** shall be assigned.

A new **EAS_event_ID** shall be assigned if any parameter defining the event changes; that is, any field following the **EAS_event_ID** itself, excluding the **alert_message_time_remaining** field.

NOTE—An Emergency Alert event with **EAS_event_ID** value A may be followed later by another event with **EAS_event_ID** value B. Since B represents a change to the contents of the **cable_emergency_alert()** message, the **sequence_number** for B is incremented. The notification of event A could then be repeated, with the **sequence_number** incremented yet again. As long as no aspect of event A was changed, the originally assigned **EAS_event_ID** value for that event could be used for the repeat notification. Receiving devices that had seen and processed the original event A, could then recognize this as a repetition and discard it.

NOTE—Design consideration should be given to initial acquisition of a **cable_emergency_alert()** table section.

EAS_originator_code—The EAS originator code defined by 47 C.F.R. Part 11 [3], indicating the entity that originally initiated the activation of the EAS. Receiving devices process the **cable_emergency_alert()** message for any value in this field. Processing of the **EAS_originator_code** in receiving devices is optional, but may be used with **EAS_event_code** to trigger various alarms or attention-getting behavior in the equipment. **EAS_originator_code** is coded as three ASCII characters. The originator codes defined in 47 C.F.R. §11.31(d) [3] are reprinted in Table 2.

EAS_originator_code	Meaning
PEP	Primary Entry Point System
WXR	National Weather Service
CIV	Civil Authorities
EAS	Broadcast station or cable system

Table 2 EAS Originator Code (Informative)

EAS_event_code_length — An 8-bit unsigned integer that shall indicate the length in bytes of the **EAS_event_code** field to follow.

EAS_event_code—The EAS event code defined by 47 C.F.R. Part 11 [3], indicating the nature of the EAS activation. Receiving devices process the **cable_emergency_alert()** message for any value in this field. Processing of the **EAS_event_code** in receiving devices is optional, but may be used to trigger various alarms or attention-getting behavior in the equipment beyond handling the mandatory actions required by the **cable_emergency_alert()** message. **EAS_event_code** shall be coded as n ASCII characters, where n is given by **EAS_event_code_length**. The event codes defined in 47 C.F.R. §11.31(e) [3] are reprinted in Table 3.