ATSC

ADVANCED TELEVISION SYSTEMS COMMITTEE

ATSC Mobile DTV Standard: A/153 Part 10, Mobile Emergency Alert System (A/153 Part 10:2013)

Doc. A/153 Part 10:2013
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Advanced Television Systems Committee
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Specifically, ATSC is working to coordinate television standards among different communications media focusing on digital television, interactive systems, and broadband multimedia communications. ATSC is also developing digital television implementation strategies and presenting educational seminars on the ATSC standards.

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Revision History

Version	Date
Initial version of standard approved	11 March 2013
Typo in Section 1 corrected; other errata addressed	21 March 2013

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ATSC Mobile DTV Standard
A/153 Part 10, Mobile Emergency Alert System

1. SCOPE

The normative portions of this Part provide specific details of the ATSC Mobile DTV (mobile/handheld, or simply "M/H") Emergency Alert System, including emergency alert tables, signaling for wake-up, and automatic tuning. Additions to the FLUTE FDT instance for non-real-time transmission are also included.

1.1 Introduction and Background

Carriage of emergency alert messages is enabled in mobile DTV signals via the methodology described below.

A high level overview of a possible implementation is shown in Figure 1.1. Input to the system consists of alert message files formatted in the Common Alerting Protocol (CAP) and further constrained by a profile of the Integrated Public Alert and Warning System (IPAWS). These properly formatted and properly constrained alert message files can be issued by FEMA through its Alert Aggregator, can be issued by other providers of emergency information, or can be generated locally at a television station facility.

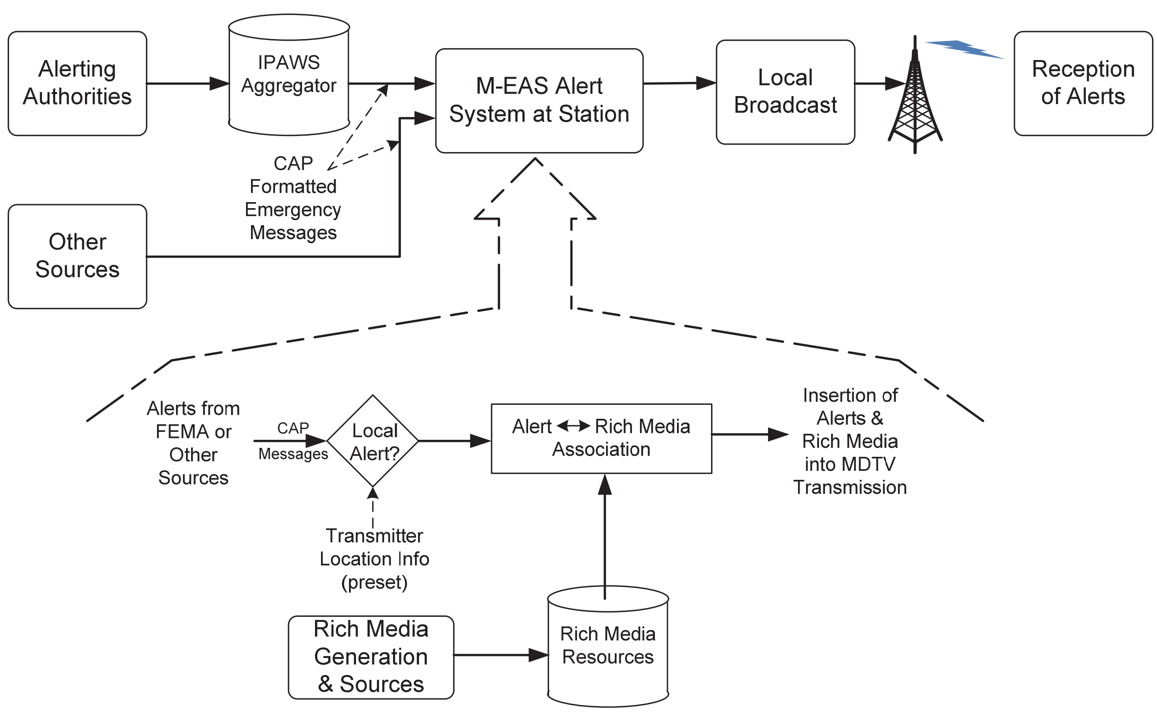

Figure 1.1 EAS Overview

The CAP IPAWS alert message files are received at the station by the M-EAS system. The M-EAS system extracts the emergency message text and other related information from the CAP IPAWS alert message file. The M-EAS system also receives optional expanded emergency information in the form of rich media (such as HTML, JPG, and MPEG-4 video). The emergency message text is broadcast in real-time via the mechanism described herein, and the additional expanded emergency information is broadcast as associated Non-Real-Time (NRT) services.

A new table, the Emergency Alert Table (EAT), using the same generic format as the service signaling tables, is added to carry and identify the CAP IPAWS alert message and identify any associated NRT services. The CAP IPAWS alert message includes the emergency text, which in A/53 legacy DTV is typically seen as a screen crawl. The alert message also includes geolocation information to identify specific geographical locations affected by the current alert. The A/153 Service Map Table (SMT) carries references to the NRT emergency content in addition to the usual references to normal audio/video content. A capability is also provided to enable an automatic tuning for specific alert information.

Additional rich media information regarding an alert, such as pictures, video, text, and maps, can be broadcast to the receiver via the associated NRT service. Information is added to the SMT and the Announcement Channel to signal and describe the service(s) that may be selected by the user during the alert event.

A signaling method to indicate an alert condition to a receiver in a sleep mode is also defined. This methodology enables minimal receiver energy use while still providing timely warnings.

1.2 Organization

This document is organized as follows:

- Section 1 – Outlines the scope of this document and provides a general introduction.
- Section 2 – Lists references and applicable documents.
- Section 3 – Provides a definition of terms, acronyms, and abbreviations for this document.
- Section 4 – Emergency Alert Table (EAT-MH).
- Section 5 – Wake-up and automatic tuning.
- Section 6 – Addition to FLUTE FDT instance schema for NRT emergency data.
- Section 7 – M-EAS NRT service category.
- Section 8 – Receiver behavior.

2. REFERENCES

All referenced documents are subject to revision. Users of this Standard are cautioned that newer editions might or might not be compatible.

2.1 Normative References

The following documents, in whole or in part, as referenced in this document, contain specific provisions that are to be followed strictly in order to implement a provision of this Standard.

[1] IEEE: “Use of the International Systems of Units (SI): The Modern Metric System,” Doc. SI 10-2002, Institute of Electrical and Electronics Engineers, New York, N.Y.

[2] OASIS: “Common Alerting Protocol, v. 1.2,” OASIS Standard, Organization for the Advancement of Structured Information Standards, Burlington, MA, 1 July 2010.

[3] OASIS: “Common Alerting Protocol, v. 1.2, USA Integrated Public Alert and Warning System Profile Version 1.0,” OASIS Standard, Organization for the Advancement of Structured Information Standards, Burlington, MA, 13 October 2009.

[4] OMA: “File and Stream Distribution for Mobile Broadcast Services, Version 1.0,” Document OMATS-BCAST_Distribution-V1_0, Open Mobile Alliance, San Diego, CA, 12 February 2009.

[5] ATSC: "ATSC Mobile/Handheld Digital Television Standard, Part 3 – Service Multiplex and Transport Subsystem Characteristics," Doc. A/153 Part 3:2013, Advanced Television Systems Committee, Washington, D.C., 11 March 2013.

[6] IETF: "DEFLATE Compressed Data Format Specification, version 1.3," Doc. RFC 1951, Internet Engineering Task Force, Freemont, CA.

[7] IETF: "FLUTE – File Delivery over Unidirectional Transport," Doc. RFC 3926, Internet Engineering Task Force, Freemont, CA, October 2004.

[8] ATSC: "Non-Real-Time Content Delivery," Doc. A/103:2012, Advanced Television Systems Committee, Washington, D.C., 9 May 2012.

[9] ATSC: "ATSC Mobile DTV Standard A/153 Part 9, Scalable Full Channel Mobile Mode," Doc. A/153 Part 9:2013, Advanced Television Systems Committee, Washington, D.C., 111 March 2013.

3. DEFINITION OF TERMS

With respect to definition of terms, abbreviations, and units, the practice of the Institute of Electrical and Electronics Engineers (IEEE) as outlined in the Institute's published standards [1] shall be used. Where an abbreviation is not covered by IEEE practice or industry practice differs from IEEE practice, the abbreviation in question will be described in Section 3.3 of this document.

3.1 Compliance Notation

This section defines compliance terms for use by this document:

shall – This word indicates specific provisions that are to be followed strictly (no deviation is permitted).

shall not – This phrase indicates specific provisions that are absolutely prohibited.

should – This word indicates that a certain course of action is preferred but not necessarily required.

should not – This phrase means a certain possibility or course of action is undesirable but not prohibited.

3.2 Treatment of Syntactic Elements

This document contains symbolic references to syntactic elements used in the audio, video, and transport coding subsystems. These references are typographically distinguished by the use of a different font (e.g., restricted), may contain the underscore character (e.g., sequence_end_code) and may consist of character strings that are not English words (e.g., dynrng).

3.2.1 Reserved Elements

One or more reserved bits, symbols, fields, or ranges of values (i.e., elements) may be present in this document. These are used primarily to enable adding new values to a syntactical structure without altering its syntax or causing a problem with backwards compatibility, but they also can be used for other reasons.

The ATSC default value for reserved bits is '1.' There is no default value for other reserved elements. Use of reserved elements except as defined in ATSC Standards or by an industry standards setting body is not permitted. See individual element semantics for mandatory settings and any additional use constraints. As currently-reserved elements may be assigned values and meanings in future versions of this Standard, receiving devices built to this version are expected to ignore all values appearing in currently-reserved elements to avoid possible future failure to function as intended.

3.3 Acronyms and Abbreviation

The following acronyms and abbreviations are used within this document.

ATSC – Advanced Television Systems Committee

CAP – Common Alerting Protocol

EAT-MH – Emergency Alert Table for Mobile/Handheld broadcast

FEMA – Federal Emergency Management Agency, an agency within the Department of Homeland Security within the United States

GAT – Guide Access Table (this is listed in A/153 Part 3 [5], as is GAT-MH)

HTML – Hypertext Markup Language

IPAWS – Integrated Public Alert and Warning System

JPG – A file extension label for the JPEG image file compression format developed by the Joint Photographic Experts Group

M-EAS – Mobile Emergency Alert Service

MPEG-4 – Motion Picture Experts Group video encoding format as described in ISO/IEC 14496-10

NTP – Network Time Protocol (this is listed in A/153 Part 3 [5])

3.4 Terms and Definitions

The following terms are used within this document.

Alert Aggregator – The functional system to collect and aggregate emergency alerts and provide a single feed of alerts to emergency alert distributors. FEMA has accepted this role in the United States.

reserved – Set aside for future use by a Standard.

4. EMERGENCY ALERT TABLE (EAT-MH)

4.1 EAT-MH Function and Placement

An Emergency Alert Table (EAT-MH) is added to the Service Signaling Channel. The EAT-MH is separate from the SMT to reduce potential bandwidth loading in the SMT, which is required to repeat at a one second rate. The EAT-MH appears in the Service Signaling Channel and contains alert messages, which are CAP-formatted [2] and further constrained by the IPAWS profile [3], and which are issued from FEMA or other providers of emergency information. The EAT-MH also contains additional information related to each message, particularly, a reference to any NRT service associated with the emergency message and carrying expanded emergency information.

The data flow with EAT-MH is illustrated in Figure 4.1.

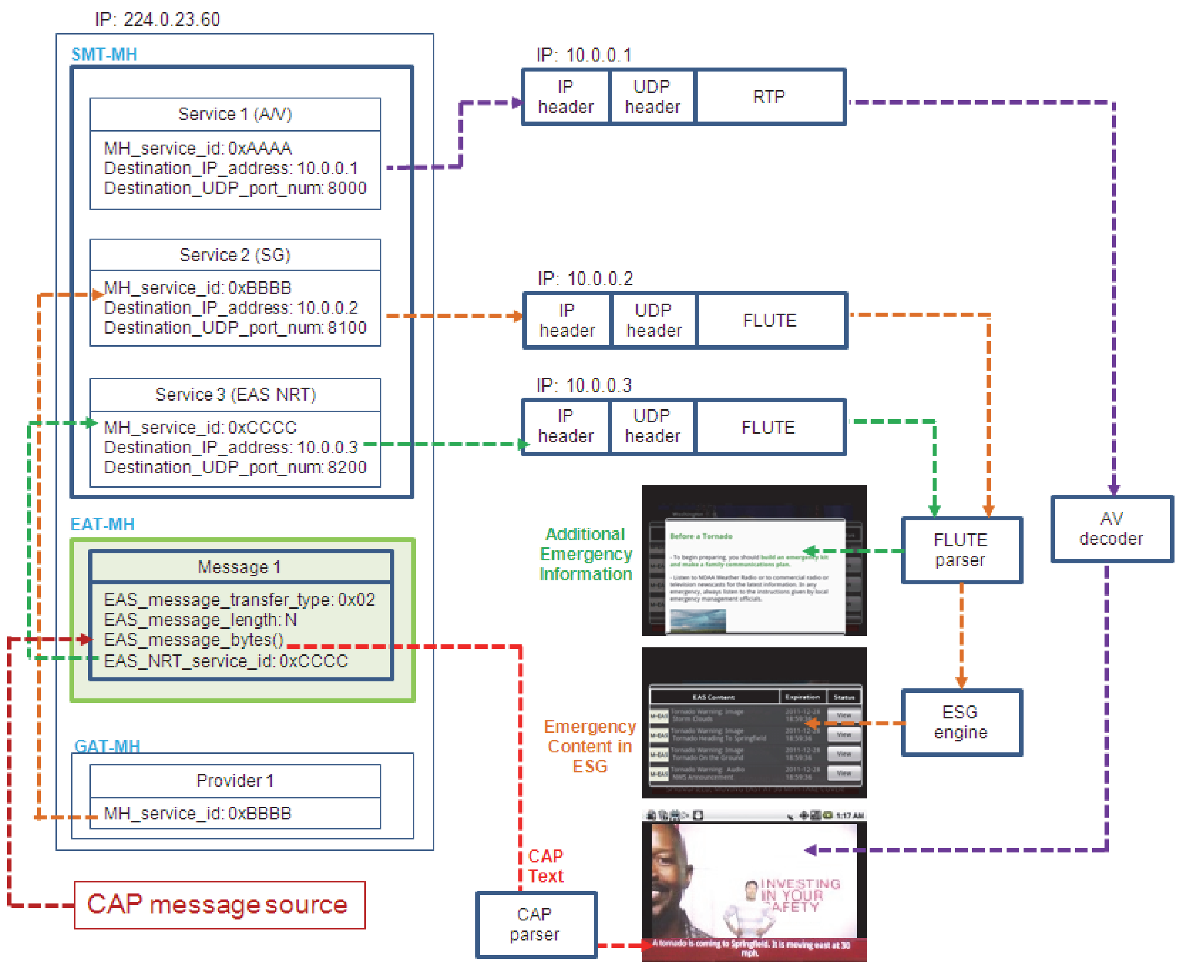

Figure 4.1 Data flow with EAT-MH.

4.2 EAT-MH Content, Syntax, and Semantics

To reduce the size of the table, the CAP alert messages are compressed. An M/H receiver that recognizes the EAT-MH can extract the compressed CAP messages, decompress them, and display the alert message texts rapidly without reference to the SMT. The EAT-MH also carries exactly one NRT_service_id entry per alert message, which, if not zero, indicates that additional information related to the alert message is sent through the NRT (Non-Real-Time) service. A receiver that is capable of the NRT function can get and display such additional alert information by reference to the SMT, the Service Guide (Announcement) and the FLUTE session(s) signaled for the NRT service.

The repeat rate of the EAT-MH is expected to vary based on the priority of the alert message. Highest priority messages can be repeated once per M/H Frame during their initial transmission.

The bit stream syntax for the EAT-MH shall be as shown in Table 4.1.

Table 4.1 EAT-MH

Syntax	No. Bits	Format
EAT_MH_section() {		
table_id	8	0xEA
section_syntax_indicator	1	'0'
private_indicator	1	'1'
reserved	2	'11'
section_length	12	uimsbf
table_id_extension {		
EAT_MH_protocol_version	8	0x0
ensemble_id	8	uimsbf
}		
reserved	2	'11'
version_number	5	uimsbf
current_next_indicator	1	'1'
section_number	8	uimsbf
last_section_number	8	uimsbf
automatic_tuning_flag	1	bslbf
num_EAS_messages	7	uimsbf
If (automatic_tuning_flag == 0x01) {		
automatic_tuning_info		
(		
automatic_tuning_channel_number	8	uimsbf
automatic_tuning_ensemble_id	8	uimsbf
automatic_tuning_service_id	16	uimsbf
)		
}		
for (m=0; m< num_EAS_messages; m++) {		
EAS_message_id	32	uimsbf
reserved	1	'1'
EAS_IP_version_flag	1	bslbf
EAS_message_transfer_type	3	uimsbf
EAS_message_encoding_type	3	uimsbf
if(EAS_message_transfer_type == 0x02) {		
reserved	4	'1111'
EAS_message_length /* N */	12	uimsbf
EAS_message_bytes()	8*N	var
}		
else if (EAS_message_transfer_type == 0x03) {		
IP_address	32 or 128	uimsbf
UDP_port_num	16	uimsbf
}		
EAS_NRT_service_id	16	uimsbf
}		
}		

table_id – This 8-bit field shall contain the unsigned integer number 0xEA, which indicates the type of table section to be an Emergency Alert Table section for ATSC-M/H (EAT-MH).

EAT_MH_protocol_version – An 8-bit unsigned integer field whose function is to allow, in the future, this Emergency Alert Table to carry parameters that may be structured differently than those defined in the current protocol. For the first protocol version, the value for EAT_MH_protocol_version shall be zero. Nonzero values of EAT_MH_protocol_version may be used by a future version of this standard to indicate structurally different tables.

ensemble_id – The value of this 8-bit unsigned integer field shall be the Ensemble ID associated with this M/H Ensemble.

automatic_tuning_flag – A 1-bit Boolean flag that shall indicate, when set to '1', that automatic_tuning_channel_number, automatic_tuning_ensemble_id, and automatic_tuning_service_id fields are present in this EAT-MH section.

automatic_tuning_channel_number – The value of this 8-bit unsigned integer field shall represent the physical RF channel number for automatic tuning.

automatic_tuning_ensemble_id – An 8-bit unsigned integer field that represents the automatic tuning ensemble ID.

automatic_tuning_service_id – A 16-bit unsigned integer field that represents the target A/V service of the automatic tuning.

> Note: If automatic tuning is indicated in an EAT-MH, that EAT-MH may or may not include an alert message. When automatic tuning is indicated, the receiver is expected to ignore the message and tune to the target channel number.

num_EAS_messages – The value of this 7-bit unsigned integer field shall specify the number of alert messages described in this EAT-MH section.

EAS_message_id – The value of this 32-bit field shall uniquely identify the EAS message in the context of a particular M/H broadcast (i.e., TSID) for a time window of at least 2 days. For example, the value could be derived as bits 13 through 44 of a 64-bit NTP timestamp corresponding to the time at which the alert was processed.

EAS_IP_version_flag – The value of this 1-bit indicator, when set to '0', shall indicate that IP_address field contains IPv4 addresses. The value of '1' for this field is reserved for possible future indication that the IP_address field is for IPv6. Use of IPv6 addressing is not currently defined.

EAS_message_transfer_type – The value of this 3-bit field shall indicate the transfer type of the alert message as defined in Table 4.2.

Table 4.2 EAS_message_transfer_type Value

Value	Designation
'000'	Not Specified
'001'	There is no alert message. Only NRT files are being sent without any alert message.
'010'	Alert message bytes shall be included in the EAT-MH. Alert message shall be transferred through the following EAS_message_bytes() field in the message loop of the EAT-MH.
'011'	Alert message shall be transferred through IP datagram.
'100' ~'111'	Reserved for future use

EAS_message_encoding_type – The value of this 3-bit field shall indicate the encoding scheme of the alert message as defined in Table 4.3.

Table 4.3 EAS_message_encoding_type Value

Value	Designation
'000'	Not Specified
'001'	No Encoding
'010'	DEFLATE
'100'~'111'	Reserved for future use

No Encoding – The message bytes are unaltered from the plain text.

DEFLATE – The entire message is compressed according to the DEFLATE [6] algorithm.

EAS_message_length – The value of this 12-bit field shall indicate the length of the EAS_message_bytes field, in bytes. The value of this field shall not be zero. EAS_message_length shall not be over 4077 bytes or less than 1 byte. CAP messages over this size shall be carried as transfer type 0x03.

Note: The section_length field of the MH Table section is a 12-bit field.

EAS_message_bytes – This variable-length field shall contain the bytes of the compressed alert message. These bytes shall be per the CAP standard [2] as constrained further by the IPAWS Profile [3].

EAS_NRT_service_id – If there is an associated M-EAS NRT service that delivers additional content for this alert message, the value of this 16-bit field shall specify the service_id of the non-real-time service. If there is no associated M-EAS NRT service for this alert message, this field shall be set to "0." This service_id shall be inserted also in the Service Map Table transmitted within the same ensemble in which the EAT-MH is transmitted.

An IP datagram used to carry an EAS message shall use the syntax shown in Table 4.4. This syntax is for EAS_message_transfer_type "0x03".

Table 4.4 IP Datagram Syntax Used to Send the EAS Message Bytes

Syntax	No. Bits	Format
emergency_alert_IP_datagram() {		
IP_header		
UDP_header		
{		
EAS_message_id	32	uimsbf
EAS_message_length	16	uimsbf
EAS_message_bytes()	N	var
}		
}		

EAS_message_id – The value of this 32-bit field shall be identical to that of a corresponding alert message entry in the EAT-MH.

EAS_message_length – The value of this 16-bit field shall indicate the length of the EAS_message_bytes field.

EAS_message_bytes – This variable-length field shall contain the bytes of the compressed alert message. These bytes shall be per CAP [2] as constrained further by IPAWS Profile [3].

Note: The maximum size of an IPv4 datagram is 65535 bytes. Since this includes IP and UDP headers in this case, the total size of all message ID/length/data sequences in an EAS message datagram is required to be less than 65507 bytes.

5. WAKE-UP AND AUTOMATIC TUNING

This section defines a mechanism by which M/H receivers in the Standby mode could react to certain alert messages via a wake-up function, as illustrated in Figure 5.1. Wake-up capable M/H receivers are expected to monitor the signal from one of the broadcasters that have been noted to have sent an EAT-MH.

5.1 Signaling for Wake-Up

Minimized battery consumption is facilitated by signaling in the minimum possible unit of the signal. Although the smallest unit in the M/H is the FIC-segment, particularly the FIC-segment header, it is necessary to receive at least one RS frame to gather the FIC-segment. The fastest method to detect the change of the FIC-Chunk contents is monitoring the TPC. This also minimizes the battery consumption. If the fic_version in the TPC is changed, the MH receiver can turn on and receive for a full RS Frame period to gather the FIC-segment. If there is a wake-up signal in the FIC-Chunk contents, the wake-up-indicator in the FIC-segment header can then be used to determine if the MH receivers should wake up or not. It is recommended to monitor the FIC version at least once every 30 seconds to see if a wake up is signaled.

The bit stream syntax for the FIC-segment header to provide a wake-up function in the M/H receiver shall be as defined in Part 3 and is repeated below for convenience.

Table 5.1 Bit Stream Syntax for the FIC-Segment Header

Syntax	No. Bits	Format
FIC_segment_header() {		
FIC_segment_type	2	uimsbf
reserved	1	'1'
wake_up_indicator	1	bslbf
FIC_chunk_major_protocol_version	2	uimsbf
current_next_indicator	1	bslbf
error_indicator	1	bslbf
FIC_segment_num	4	uimsbf
FIC_last_segment_num	4	uimsbf
}		

5.2 Receiving EAS Data after Wake-Up

A wake-up-capable MH receiver should monitor the fic_version value in the TPC. If the receiver detects that the fic_version is changed, it should start to gather the complete FIC segment data. If the wake_up_indicator in the FIC-segment header is set to '0', the receiver should receive the ensemble indicated by the EAT_ensemble_indicator, which contains the EAT-MH in the Service Signaling Channel.

The bit stream syntax for the FIC_chunk_payload shall be as defined in A/153 Part 3 [5] or Part 9 [9].

5.2.1 Example Flow Chart for Wake-Up Process

Figure 5.1 shows an example receiver process flow for responding to the wake up indicator while minimizing the amount of battery energy expended.

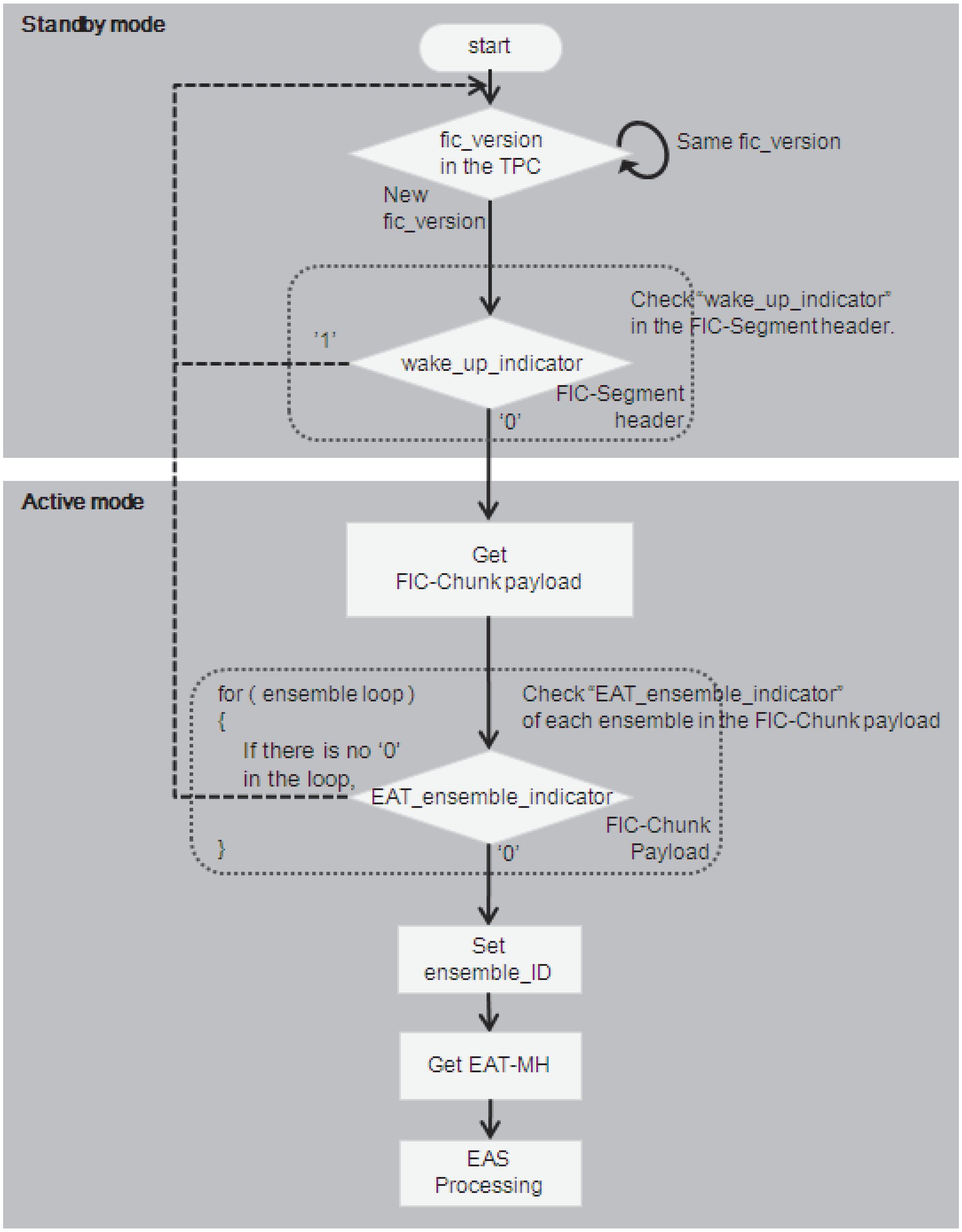

Figure 5.1 Example data flow for wake-up.

5.3 Wake-up Versioning

When a wake-up indication has been dismissed by the user, it should be possible for the receiver to ignore subsequent repeated transmissions of the same wake-up event. This can be done by checking the version number for the wake-up signal as illustrated in Figure 5.2.

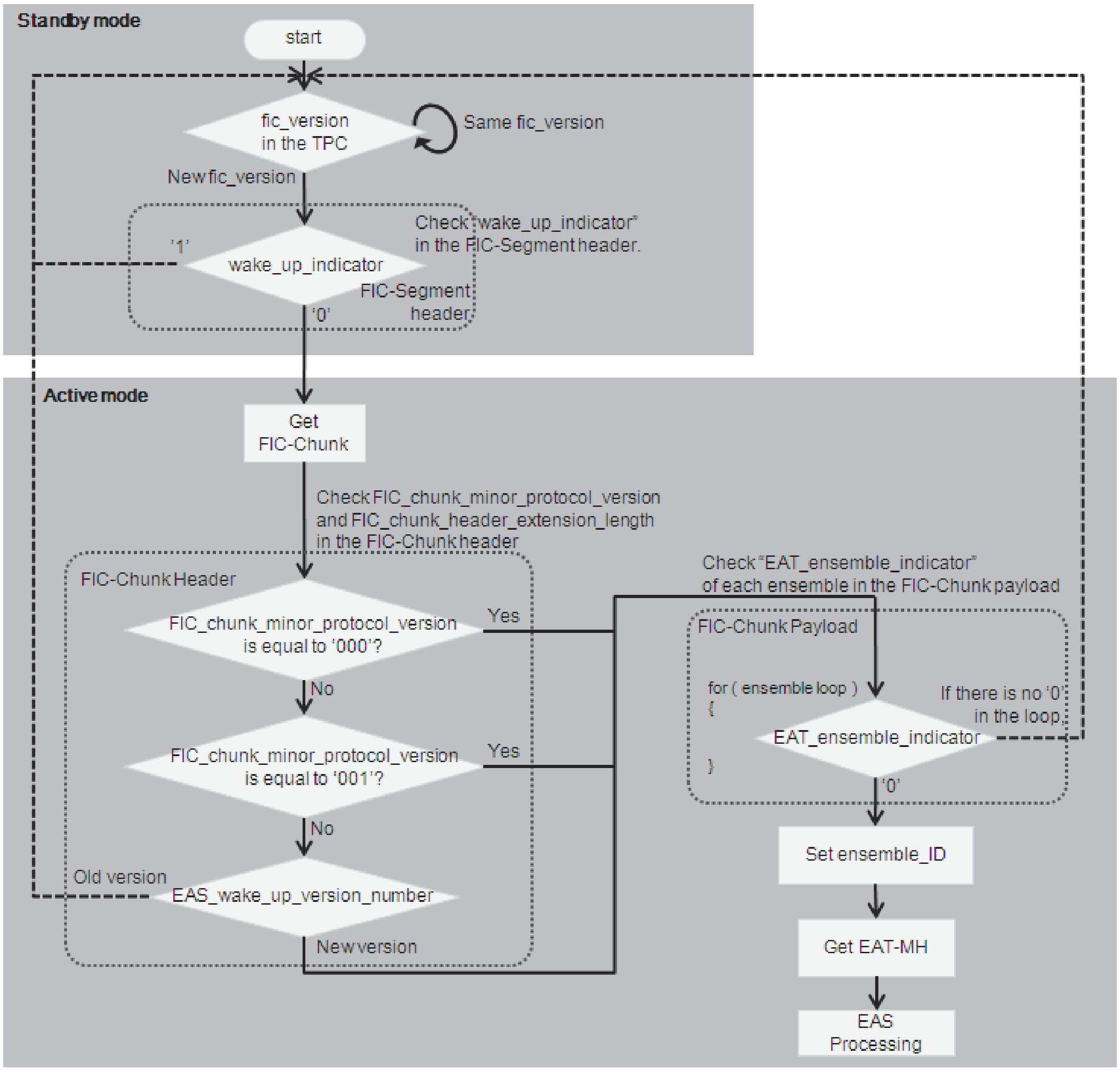

Figure 5.2 Example data flow for wake-up versioning with FIC_chunk_header_extension.

The bit stream syntax for FIC_chunk_header to manage the EAS wake-up version shall be as defined in Part 3 and Part 9 and shall be extended to add the EAS_wake_up_extended_info_Tag and EAS_wake_up_version_number elements as shown in Table 5.3. The semantics for each new field in that table shall be as defined hereafter. Note: For context, all defined fields in the FIC_chunk_header are shown.

Table 5.3 Bit Stream Syntax for the FIC-Chunk Header

Syntax	No. Bits	Format
FIC_chunk_header() {		
FIC_chunk_major_protocol_version	2	uimsbf
FIC_chunk_minor_protocol_version	3	uimsbf
FIC_chunk_header_extension_length	3	uimsbf
ensemble_loop_header_extension_length	3	uimsbf
MH_service_loop_extension_length	3	uimsbf
reserved	1	'1'
current_next_indicator	1	bslbf
transport_stream_id	16	uimsbf
if (FIC_chunk_minor_protocol_version >000)		
num_SFCMM_ensembles	8	uimsbf
if (FIC_chunk_minor_protocol_version >001) {		
Extended_FIC_chunk_header_type	8	uimsbf
Extension_value	8	uimsbf
for (i=3; i< FIC_chunk_header_extension_length; i++) {		
header_extension_byte	8	bslbf
}		
}		
num_ensembles	8	uimsbf
}		

The semantics for the fields of Table 5.3 are defined in A/153 Part 3 [5] and Part 9 [9], except for the new fields/values that are present when the FIC_chunk_minor_protocol_version is equal to '010'.

FIC_chunk_minor_protocol_version – A 3-bit unsigned integer field that represents the minor version of the syntax and semantics of the FIC-Chunk. A change in the minor version level, provided the FIC_chunk_major_protocol_version remains the same, shall indicate a backward-compatible level of change. The value of this field shall be incremented by one each time the structure of the FIC-Chunk is changed in a backward compatible manner from a previous minor version of the FIC-Chunk with the same major version, by a future version of this standard. Three minor protocol versions have been defined, as given in Table 5.4

Table 5.4 FIC_chunk_minor_protocol_version

Value	Designation
'000'	Base implementation
'001'	SFCMM extension
'010'	EAS wake-up extension

The value of this field shall be set to '010' when the EAS wake-up signaling extension is used. Otherwise, the value of this field shall be set to '000' or '001' (whether the EAT-MH is delivered via this channel or not).

FIC_chunk_header_extension_length – A 3-bit unsigned integer field that represents the length of the extension field(s) of the FIC_chunk_header() added by one or more minor version level changes of the FIC-Chunk syntax. The value of this field shall indicate the total length in bytes of extension field(s) added by all minor version changes up to the current one (for the same major version). Such extension fields shall immediately precede the num_ensembles field of the

FIC_chunk_header(), with fields added by higher minor protocol versions appearing after fields added by lower minor protocol versions (for the same major protocol version). The 3-bit length of this field requires that any change of syntax of the FIC-Chunk header which would push the total length of the extension(s) over 7 bytes will need to be treated as a major version change. The value of this field shall be set as shown in Table 5.5.

Table 5.5 FIC_chunk_header_extension_length

FIC_chunk_minor_protocol_version	Value
'000'	'000'
'001'	'001'
'010'	'011'

num_SFCMM_ensembles – This field shall be as defined in A/153, Part 9.

Extended_FIC_chunk_header_type – An 8-bit unsigned integer number that indicates the type of extended FIC chunk header being defined here. This 8-bit unsigned integer shall have the value 0x42, identifying the following byte as the EAS_wake_up_version_number. Values other than 0x42 are undefined.

Extension_value – When the value of the Extended_FIC_chunk_header_type field is 0x42 then the value of this 8-bit unsigned integer field shall represent the version number of the EAS wake-up signal(s).

When a wake-up indication has been dismissed by the user, it should be possible for the receiver to ignore subsequent repeated transmissions of the same wake-up event. This can be done by checking the version number for the wake-up signal.

5.4 Automatic Tuning

A receiver can provide automatic tuning to important alerts if automatic tuning information is provided, as illustrated in Figure 5.3.

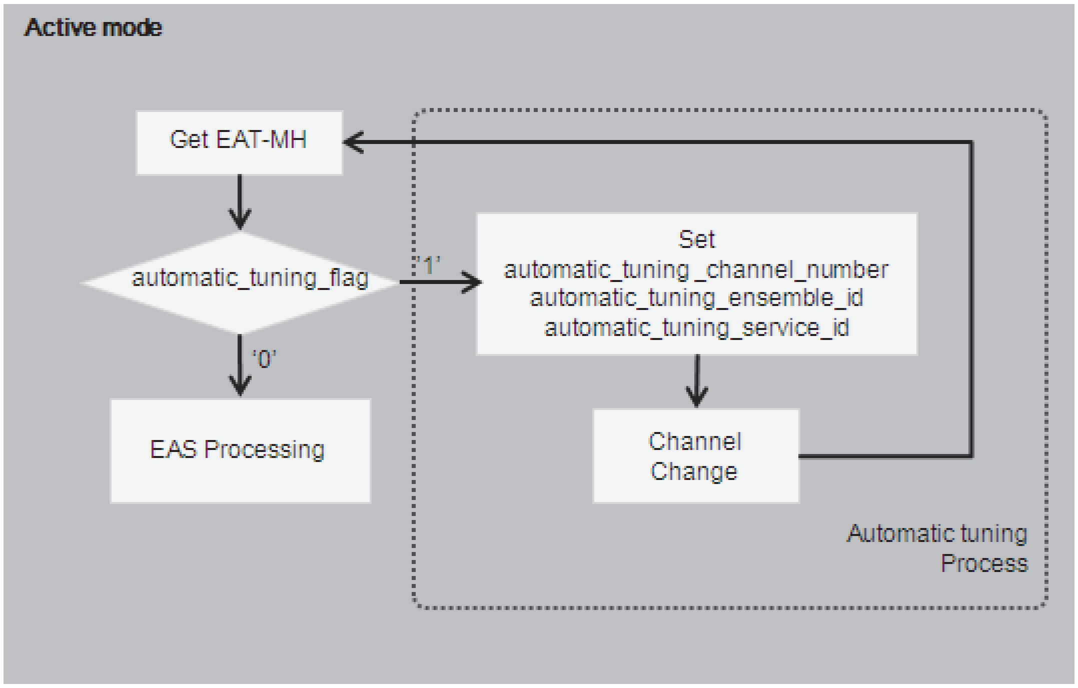

Figure 5.3 Example data flow for wake-up and automatic tuning.

The bit stream syntax for the EAT-MH to include the automatic tuning information shall be as described in Table 4.1.

6. M-EAS FLUTE FDT XML SCHEMA

The XML schema for M-EAS FLUTE FDT builds upon the OMA BCAST [4] FDT schema and ASTC NRT [8] FDT schema extensions, but also allows for sending zero files through an open NRT FLUTE session by adding the attribute "minOccurs" with value zero to the subelement "File" of the FDT instance.

The namespace for this schema shall be:

http://www.atsc.org/XMLSchemas/meas/1

The XML schema document can be found at:

http://www.atsc.org/XMLSchemas/meas/1/MEAS_FLUTE_FDT_1.0.xsd

7. M-EAS NRT SERVICE CATEGORY

As part of an M-EAS alert, additional resource content may be transmitted within the broadcast. If such content is made available, it shall be delivered by one or more instances of a special type of non-real-time service. The M/H service ID of each instance is indicated in an EAS_NRT_service_id field in the EAT-MH entry for the alert.

Any M-EAS NRT service present in the broadcast shall be announced and transmitted in the same way as the NRT services standardized in A/103 [8], except that a different service category shall be used, as follows.

- **Signaling** – For an M-EAS NRT service, the service_category field in the entry for the service in the SMT-MH shall be set to 0x0F (versus 0x0E for NRT). Note that, per A/153 Part 3

[5], the service_category value (0x0F for M-EAS NRT) also appears in the MH_service_category field in the entry for the service in the SLT if the SLT is used

- **Announcement**; mandatory for NRT – For an M-EAS NRT service, the ServiceType element included in the Service fragment in the Service Guide transmitted in the Announcement channel shall have the value 130 (versus 129 for NRT).

Except as specified herein, an M-EAS NRT service must conform to all mandatory aspects of an NRT service as defined in A/103. In particular, files are delivered using the FLUTE protocol with extensions defined in A/103 to support the concept of a "content item". Each additional info resource delivered as part of an M-EAS alert constitutes a single content item, although each content item may in fact represent a collection of related files, such as a web page, as described in A/103.

In addition, an M-EAS NRT service is subject to some restrictions relative to A/103 as specified in the next section.

7.1 Restrictions, Extensions, and Profiling of A/103 for M-EAS

A/103 allows for a variety of non-real-time service models, not all of which are relevant for M-EAS. Some optional aspects and choices within A/103 are restricted in the present standard for the M-EAS usage.

7.1.1 Consumption Model

The consumption model for an M-EAS NRT service shall be announced as the "Push" model (consumption_model field value = 0x03) as currently defined in A/103.

An M-EAS-aware receiver is expected to subscribe to all content items and updates in the Push service. That is, the user interaction expected for the usual NRT Push model, in which the user selects individual content items for consumption, would not take place. An M-EAS receiver would be expected to automatically select Auto-Update for all content items in the service.

7.1.2 Geographic Targeting

If an alert is geographically targeted, as indicated in an <area> element within a CAP [2] [3] message, the Service fragment in the Service Guide for any related M-EAS NRT service and/or the Content fragments for the additional resources shall include a BroadcastArea element that includes one or more name_area elements representing the same set of geocodes as contained in the <area> element.

7.1.3 Stand-Alone Services

Since the EAT-MH identifies the services used to transport additional resources, there is no reason to associate these services with a particular A/V service. Therefore, an M-EAS service shall always be a stand-alone NRT service. That is, no other M/H service shall refer to the M-EAS service via an Associated Service Descriptor in the SMT-MH or AssociatedServiceReference element in the Service Guide.

7.1.4 Internet Location

In order to avoid triggering mobile network congestion, the transmission should not signal alternative availability of NRT files via the internet. That is, within the Service Guide, the InternetLocations element within the Content fragment and within the ContentDefaults subelement of the Service fragment should not be used.

> Note 1: There have been real examples of this kind of self-induced Distributed Denial of Service attack that have crashed unicast networks.

Note 2: The CAP message itself may include resource URLs.

8. RECOMMENDED RECEIVER BEHAVIOR

8.1 Receiver CAP Message Handling

In the most simple operation, a receiver will process a CAP message and keep it current until an update or cancel message comes along. However, there can be conditions where the handling of messages is more complex.

Multiple Messages – One example is the situation where a new message thread begins before a previous thread ends. In this case, the receiver can use the priority of the messages to determine which to display first. Generally, the display can present each message and give the user the option to cancel one or more messages. The user should have the capability to return to any currently active message.

Lost Messages – While the CAP message includes fields to link updates in message threads, the possibility exists for a link in the thread to be missed. In this case, the receiver must decide when to cancel the message. If the CAP message includes the expiration information, then the termination time is obvious. If the expiration time is not in the message, then it is suggested that the receiver should terminate the message response based upon:

a) User request.

b) A default timeout. A suggested default is 5 minutes.

New Signal Acquisition – Reception is lost and subsequently a new signal is acquired. If the EAT-MH contains an update message and the receiver does not have any associated reference messages, the update message can be treated as a new alert message. If a cancel message is delivered via the EAT-MH and the receiver does not have any associated reference messages, the cancel message can be ignored. If the receiver has retained old messages that are not included in the current EAT-MH of the newly acquired signal, these messages can be treated as expired messages.

End of Alerts – If the received signal includes an empty EAT-MH, the receiver can interpret this as a cancellation of all previous alerts. This condition can only occur if the station has already cancelled all previous alert messages.

Further clarifications can be found in CEA CEB25 Best Practices for Implementing Common Alerting Protocol (CAP) based Alerts for Consumer Electronics Devices.

8.2 Expected Receiver Functionality

An M-EAS receiver conforming to this Part is expected to support at least the following set of functions:

- Recognize and respond to the CAP/IPAWS message content
- Recognize and respond to signaling of service_category value 0x0F
- Recognize and respond to announcement of ServiceType value 130
- Subscribe to all content items and updates in the M-EAS NRT (Push) service, selecting Auto-Update for all such items