TECHNICAL SPECIFICATION

ISO/TS 21219-19

Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) —

Part 19:
Weather information (TPEG2-WEA)

Systèmes intelligents de transport — Informations sur le trafic et le tourisme via le groupe expert du protocole de transport, génération 2 (TPEG2) —

Partie 19: Renseignements météorologiques (TPEG2-WEA)

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*, in cooperation with the Traveller Information Services Association (TISA), TPEG Applications Working Group through Category A Liaison status.

ISO/TS 21219 consists of the following parts, under the general title *Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2)*:

— *Part 1: Introduction, numbering and versions*

— *Part 2: UML modelling rules*

— *Part 3: UML to binary conversion rules*

— *Part 4: UML to XML conversion rules*

— *Part 5: Service framework*

— *Part 6: Message management container*

— *Part 9: Service and network information*

— *Part 10: Conditional access information*

— *Part 14: Parking information application*

— *Part 18: Traffic flow and prediction application*

— *Part 19: Weather information*

The following parts are under preparation:

— *Part 15: Traffic event compact*

— *Part 16: Fuel price information application*

The following parts are planned:

— *Part 7: Location referencing container*

— *Part 11: Universal location reference*

— *Part 21: Geographic location referencing*

— *Part 22: OpenLR location referencing*

— *Part 23: Road and multimodal routes application*

— *Part 24: Light encryption*

— *Part 25: Electromobility charging infrastructure*

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Introduction

History

TPEG technology was originally proposed by the European Broadcasting Union (EBU) Broadcast Management Committee, who established the B/TPEG project group in the autumn of 1997 with a brief to develop, as soon as possible, a new protocol for broadcasting traffic and travel-related information in the multimedia environment. TPEG technology, its applications and service features were designed to enable travel-related messages to be coded, decoded, filtered and understood by humans (visually and/or audibly in the user's language) and by agent systems. Originally, a byte-oriented data stream format, which may be carried on almost any digital bearer with an appropriate adaptation layer, was developed. Hierarchically structured TPEG messages from service providers to end-users were designed to transfer information from the service provider database to an end-user's equipment.

One year later in December 1998, the B/TPEG group produced its first EBU specifications. Two documents were released. Part 2 (TPEG-SSF, which became ISO/TS 18234-2) described the Syntax, Semantics and Framing structure, which was used for all TPEG applications. Meanwhile, Part 4 (TPEG-RTM, which became ISO/TS 18234-4) described the first application, for Road Traffic Messages.

Subsequently in March 1999, CEN TC 278/WG 4, in conjunction with ISO/TC 204/WG 10, established a group comprising members of the former EBU B/TPEG and this working group continued development work. Further parts were developed to make the initial set of four parts, enabling the implementation of a consistent service. Part 3 (TPEG-SNI, ISO/TS 18234-3) described the Service and Network Information application, used by all service implementations to ensure appropriate referencing from one service source to another.

Part 1 (TPEG-INV, ISO/TS 18234-1) completed the series by describing the other parts and their relationship; it also contained the application IDs used within the other parts. Additionally, Part 5, the Public Transport Information application (TPEG-PTI, ISO/TS 18234-5), was developed. The so-called TPEG-LOC location referencing method, which enabled both map-based TPEG-decoders and non-map-based ones to deliver either map-based location referencing or human readable text information, was issued as ISO/TS 18234-6 to be used in association with the other applications parts of the ISO/TS 18234 series to provide location referencing.

The ISO/TS 18234 series has become known as TPEG, generation 1.

TPEG generation 2

When the Traveller Information Services Association (TISA), derived from former Forums, was inaugurated in December 2007, TPEG development was taken over by TISA and continued in the TPEG applications working group.

It was about this time that the (then) new Unified Modelling Language (UML) was seen as having major advantages for the development of new TPEG applications in communities who would not necessarily have binary physical format skills required to extend the original TPEG TS work. It was also realized that the XML format for TPEG described within the ISO/TS 24530 series (now superseded) had a greater significance than previously foreseen; especially in the content-generation segment and that keeping two physical formats in synchronism, in different standards series, would be rather difficult.

As a result, TISA set about the development of a new TPEG structure that would be UML based – this has subsequently become known as TPEG Generation 2.

TPEG2 is embodied in the ISO/TS 21219 series and it comprises many parts that cover introduction, rules, toolkit and application components. TPEG2 is built around UML modelling and has a core of rules that contain the modelling strategy covered in Parts 2, 3, 4 and the conversion to two current physical formats: binary and XML; others could be added in the future. TISA uses an automated tool to convert from the agreed UML model XMI file directly into an MS Word document file, to minimize drafting errors, that forms the Annex for each physical format.

TPEG2 has a three container conceptual structure: Message Management (ISO/TS 21219-6), Application (many ISO/TS 21219 parts) and Location Referencing (ISO/TS 21219-7). This structure has flexible capability and can accommodate many differing use cases that have been proposed within the TTI sector and wider for hierarchical message content.

TPEG2 also has many location referencing options as required by the service provider community, any of which may be delivered by vectoring data included in the Location Referencing Container.

The following classification provides a helpful grouping of the different TPEG2 parts according to their intended purpose:

Toolkit parts: TPEG2-INV (ISO/TS 21219-1), TPEG2-UML (ISO/TS 21219-2), TPEG2-UBCR (ISO/TS 21219-3), TPEG2-UXCR (ISO/TS 21219-4), TPEG2-SFW (ISO/TS 21219-5), TPEG2-MMC (ISO/TS 21219-6), TPEG2-LRC (ISO/TS 21219-7);

Special applications: TPEG2-SNI (ISO/TS 21219-9), TPEG2-CAI (ISO/TS 21219-10);

Location referencing: TPEG2-ULR (ISO/TS 21219-11), TPEG2-GLR (ISO/TS 21219-21), TPEG2-OLR (ISO/TS 21219-22);

Applications: TPEG2-PKI (ISO/TS 21219-14), TPEG2-TEC (ISO/TS 21219-15), TPEG2-FPI (ISO/TS 21219-16), TPEG2-TFP (ISO/TS 21219-18), TPEG2-WEA (ISO/TS 21219-19), TPEG2-RMR (ISO/TS 21219-23).

TPEG2 has been developed to be broadly (but not totally) backward compatible with TPEG1 to assist in transitions from earlier implementations, while not hindering the TPEG2 innovative approach and being able to support many new features, such as dealing with applications having both long-term, unchanging content and highly dynamic content, such as Parking Information.

This Technical Specification is based on the TISA specification technical/editorial version reference:

SP13002/1.1/001

Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) —

Part 19:
Weather information (TPEG2-WEA)

1 Scope

This part of ISO/TS 21219 defines the TPEG Weather (WEA) application for reporting weather information for travellers. It provides general weather-related information to all travellers and is not limited to a specific mode of transportation.

This application does not provide specific weather-related safety warnings to drivers; these are provided as Safety Related Messages as part of the TPEG2-TEC application.

The WEA application provides weather-related forecasts and status information over multiple time periods and for multiple, possibly linked, geographical areas.

NOTE   The presentation of the information is dependent of the specific HMI of the receiving device. This part of ISO/TS 21219, therefore, does not define any prerequisites for the HMI of the device.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TS 21219-5, *Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 5: Service framework*

ISO/TS 21219-6, *Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 2(TPEG2) — Part 6: Message management container*

ISO/TS 21219-9, *Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 2 (TPEG2) — Part 9: Service and network information*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
service
collection of different information streams (applications) logically bound together and delivered from a service provider to the end user

3.2
service component
information stream (application) that is part of a *service* (3.1)

Note 1 to entry: A TPEG stream is logically divided into parts known as service components. Each service component carries an application instance. A service component is effectively a "channel" within the multiplex of a TPEG stream. Each stream comprises a number of these "channels" which are identified by the component identifier in TPEG2-SFW and linked to the COID and AID in the TPEG2-SNI application.

3.3
message management container
concept applied to the grouping of all message elements including message management information of a TPEG-Message together in one place

3.4
location referencing
means to provide information that allows a system to accurately identify a location

Note 1 to entry: The content of a location reference allows the location to be presented in a graphical or textual manner to the end-user (e.g. coloured network graphs), as well as to be used for navigational systems purposes.

3.5
location referencing container
concept applied to the grouping of all the *location referencing* (3.4) elements, of a TPEG-Message, together in one place

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4 Abbreviated terms

ACID   Application and Content Identifier

ADC   Application Data Container

CEN   Comité Européen de Normalization

EBU   European Broadcasting Union

LRC   Location Reference Container

MMC   Message Management Container

n.a.   Not available

OSI   Open Systems Interconnection

SFW   TPEG Service Framework: Modelling and Conversion Rules

TISA   Traveller Information Services Association

TPEG   Transport Protocol Expert Group

TTI   Traffic and Traveller Information

UML   Unified Modelling Language

TEC   Traffic Event Compact

WEA   TPEG Weather

WMO   World Meteorological Organization

5 Application specific constraints

5.1 Application identification

The word "application" is used in the TPEG specifications to describe specific subsets of the TPEG structure. An application defines a limited vocabulary for a certain type of messages, for example, parking information or road traffic information. Each TPEG application is assigned a unique number, called the Application IDentification (AID). An AID is defined whenever a new application is developed and these are all listed in TPEG2-MMC (ISO/TS 21219-6).

The application identification number is used within the TPEG2-SNI (ISO/TS 21219-9) application to indicate how to process TPEG content and facilitates the routing of information to the appropriate application decoder.

5.2 Version number signalling

Version numbering is used to track the separate versions of an application through its development and deployment. The differences between these versions may have an impact on client devices.

The version numbering principle is defined in TPEG2-INV.

Table 1 shows the current version numbers for signalling WEA within the SNI application.

Table 1 — Current version numbers for signalling of WEA

Major version number	1
Minor version number	1

5.3 Ordered components

TPEG2-WEA requires a fixed order of TPEG components. The order for the WEA message component is shown in Figure 1; the first component shall be the **Message Management Container**. This shall be the only component if the message is a cancellation message. Otherwise, the MMC component shall be followed by the one or more **Application Data Container** component(s) which includes the application-specific information.
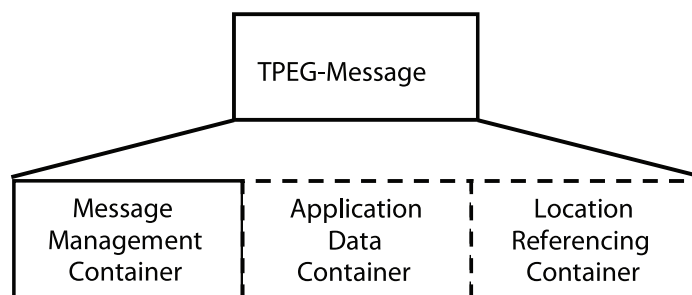

Figure 1 — Composition of TPEG messages

5.4 Extendibility

The requirement of a fixed component order does not affect the extension of WEA. Future application extensions may insert new components or may replace existing components by new ones without losing backward compatibility. That means a WEA decoder shall be able to detect and skip unknown components.

5.5 TPEG service component frame

WEA makes use of the "Service Component Frame with dataCRC and messageCount" according to TPEG2-SFW (ISO/TS 21219-5).
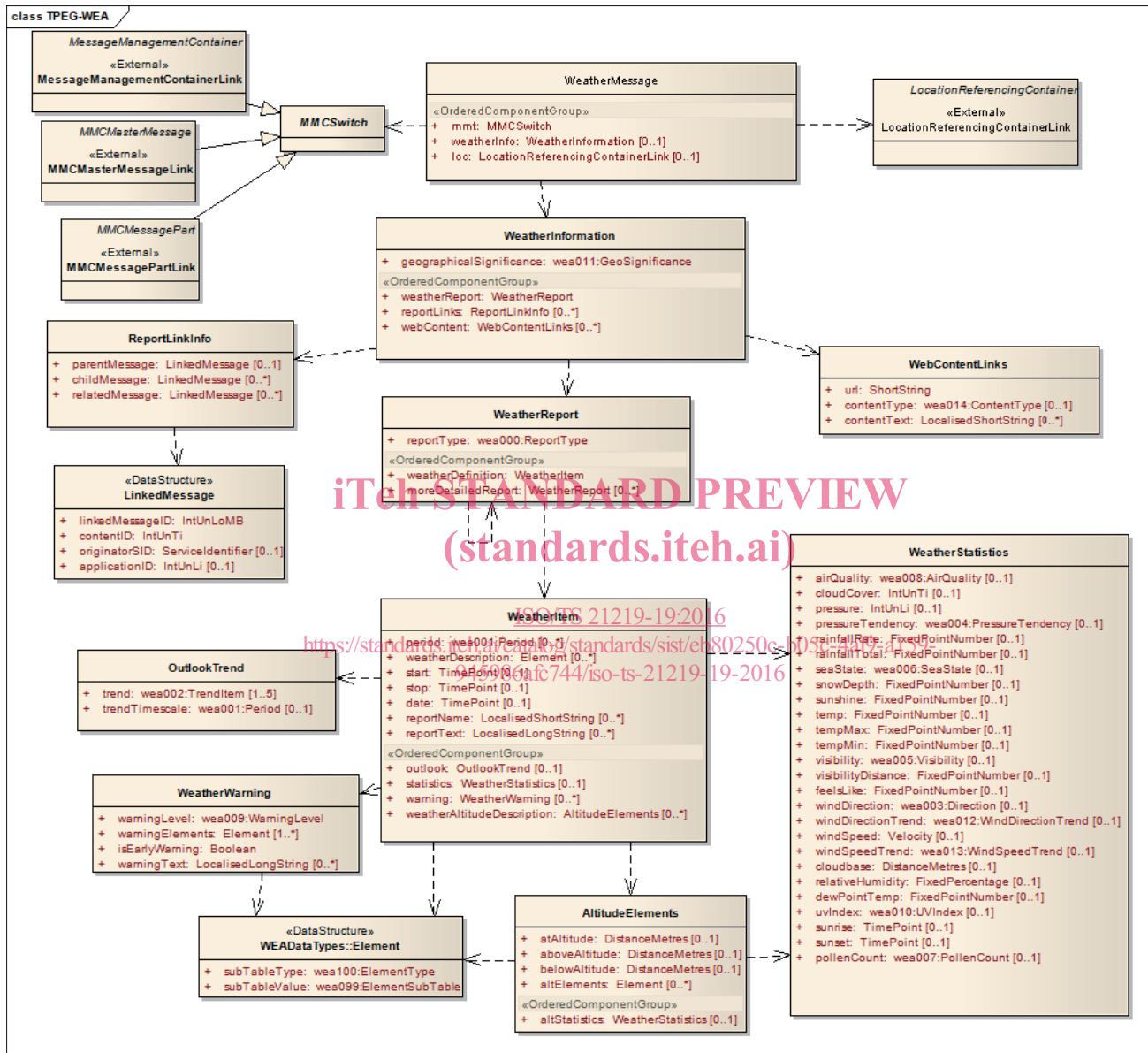
6 WEA structure


Figure 2 — WEA message structure

7 WEA message components

The WEA application provides a flexible message interface for distribution of weather information.

To enable multiple levels of detail to be signalled, WEA provides two different hierarchal structures to allow messages to cover multiple geographical areas and also to cover different time periods. Messages may be linked to each other to provide a geographical hierarchy of the weather reports which may be exploited by receivers to help users find the messages they need.

EXAMPLE   A UK service may provide a national overview, with regional reports and individual city reports.

Individual messages are linked by child and parent message IDs, as shown in Figure 3.
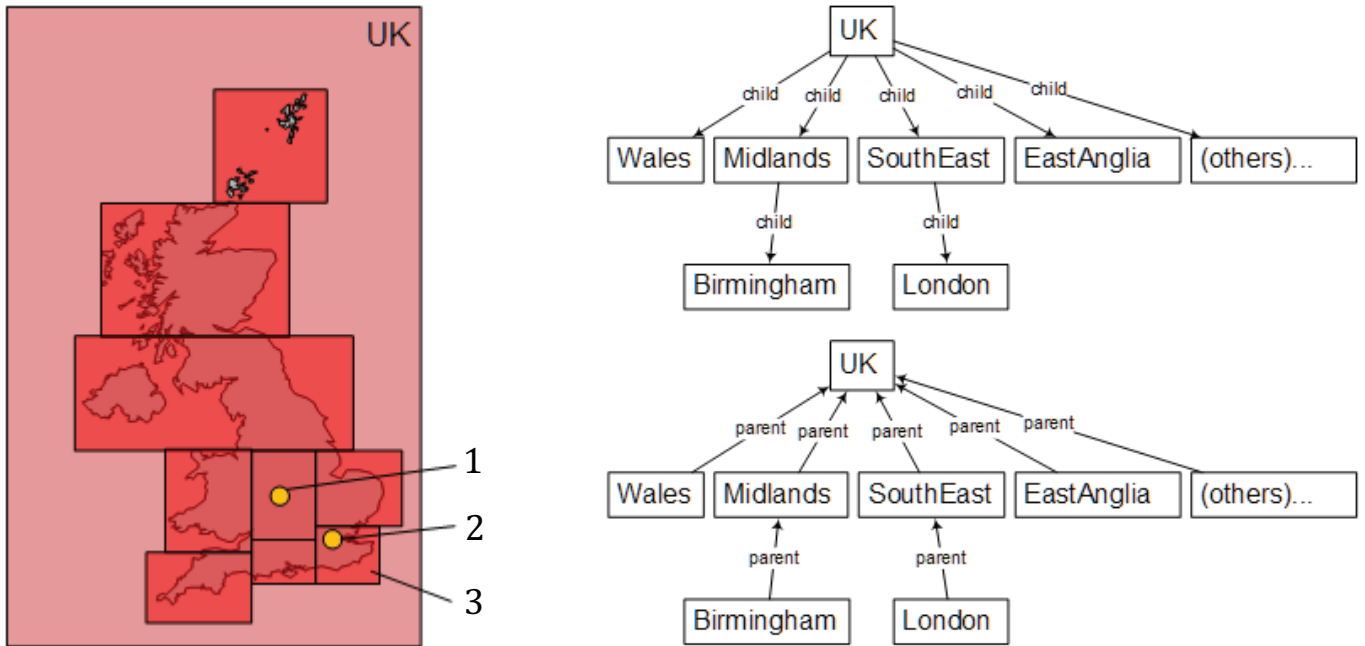
Key

1   Birmingham
2   London
3   SouthEast

NOTE   This is provided by linking individual messages in a child/parent relationship. A message may have 1 parent, but may have multiple child messages.

Figure 3 — Location hierarchy
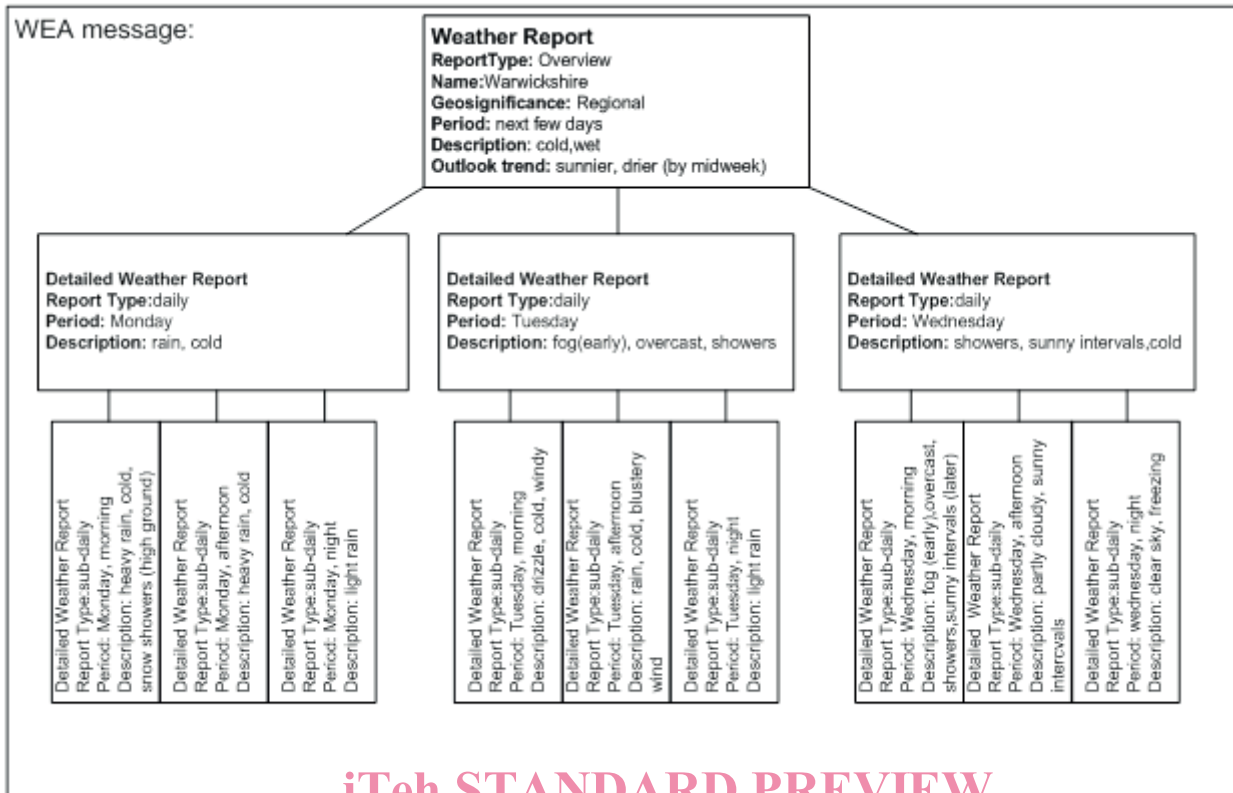
NOTE   Different timescales are covered within a specific message by use of the different levels of Report (using the reportType).

Figure 4 — Sample WEA message with different timescales covered

7.1   WeatherMessage

Each WEA message is associated with a single location and contains one or more weather reports (excluding the case of a cancellation). The encoding of a WeatherMessage is shown in Table 2.

Table 2 — WeatherMessage

Name	Type	Multiplicity	Description
Ordered components			
mmt	MMCSwitch	1	Message Management Container
weatherInfo	WeatherInformation	0..1	Weather Information (always included except for cancellation of a message)
Loc	LocationReferencingContainerLink	0..1	Location Referencing Container (always included except for cancellation of a message)

7.2   WeatherInformation

A weather report can be either a simple single level report or can be made into a hierarchy of reports associated to increasingly smaller time periods. The encoding of WeatherInformation is shown in Table 3.

<center>Table 3 — WeatherInformation</center>

Name	Type	Multiplicity	Description
geographicalSignificance	wea011:GeoSignificance	1	Defines the geographical significance or "spatial extent" of the report
Ordered components			
weatherReport	WeatherReport	1	Contains the report data, defines what type of period it covers and additional more detailed reports for smaller time periods if required
reportLinks	ReportLinkInfo	0..*	Links to related WEA reports or other TPEG messages
webContent	WebContentLinks	0..*	Allows linkage to web-based content

7.3   WeatherReport

The WeatherReport component provides the top level WeatherItem of the report and allows subsequent lower levels to be defined. A multiple level hierarchy of time periods can be defined. The encoding of a WeatherReport is shown in Table 4.

<center>Table 4 — WeatherReport</center>

Name	Type	Multiplicity	Description
reportType	wea000:ReportType	1	Defines the time "extent" of a report.
Ordered components			
weatherDefinition	WeatherItem	1	Main details of weather report
moreDetailedReport	WeatherReport	0..*	Optional next-level report

7.4   WeatherItem

The WeatherItem component defines the main content for the weatherReport; including descriptive and statistical parts. The encoding of a WeatherItem is shown in Table 5.

<center>Table 5 — WeatherItem</center>

Name	Type	Multiplicity	Description
period	wea001:Period	0..*	This provides an optional period for the report.
weatherDescription	Element	0..*	Weather description provides a qualitative description for the weather report. Any number of elements may be selected from the element tables.
start	TimePoint	0..1	Start defines the specific time of day the period of this weather report item begins. Typically hours and minutes. If stop is not defined, then start is used to define a nominal time of the report. For example: 2 pm sunny; 4 pm rain; 6 pm showers, sunny intervals.
stop	TimePoint	0..1	Stop defines the explicit end time of the period for the weather item.
date	TimePoint	0..1	This provides ability to report the main date for a report (suitable for a daily forecast). Typically date or date and month.
reportName	LocalizedShortString	0..*	Title for the WEA report e.g. "Warwickshire Forecast", "UK Weather" Multiplicity allows multiple languages to be carried.