

ITU-R

Radiocommunication Sector of ITU

Recommendation ITU-R BO.1774-2 (10/2015)

Use of satellite and terrestrial broadcast infrastructures for public warning, disaster mitigation and relief

BO Series
Satellite delivery



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Series	Title
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RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	Vocabulary and related subjects

Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

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RECOMMENDATION ITU-R BO.1774-2*

Use of satellite and terrestrial broadcast infrastructures for public warning, disaster mitigation and relief

(Question ITU-R 118/6)

(2006-2007-2015)

Scope

This Recommendation provides characteristics of satellite and terrestrial broadcasting systems used for disaster mitigation and relief operations. Detailed descriptions of these systems are given in Annex 1 as guidance, and may also be found in § 5 of Report ITU-R BT.2299 – Broadcasting for public warning, disaster mitigation and relief.

Keywords

Public warning, emergency warning system (EWS), automatic receiver activation

The ITU Radiocommunication Assembly,

considering

- a) the recent natural tragedies due for example, to earthquakes and their consequences, alongside the possible role of communications in public warning, disaster mitigation and relief;
- b) that all administrations recognize the need to organize information dealing with public warning, disaster mitigation and relief;
- c) that in cases, when the “wired” or “wireless” telecommunication infrastructure is significantly or completely destroyed by a disaster, broadcasting services can often still be employed for public warning, disaster mitigation and relief operation;
- d) that broadcast frequency bands are largely globally harmonized and could be used for disseminating public alert messages and advice to large sections of the population;
- e) that broadcast frequency bands could be used for coordination of relief activities by disseminating information from relief planning teams to the population and provide information on the well-being of individuals, especially from the affected area;
- f) that within the terrestrial broadcasting infrastructure there are a number of systems offering communication services that allow global or regional coverage;
- g) that users of the broadcasting services are expected to be using both portable and fixed terminals for emergency services, especially in sparsely populated, uninhabited or remote areas;
- h) that within the broadcasting services there is a great and growing need to determine standard international routing procedures for emergency traffic;
- i) that many administrations have already established emergency communication traffic procedures including means for secure control of their utilization;

* This Recommendation should be brought to the attention of Telecommunication Standardization Study Groups 2 and 9, and Telecommunication Development Study Group 2.

- j) that distress, emergency, safety and other communications are defined in the Radio Regulations (RR);
- k) that individual broadcasters will always have their own security control over their programme material and their network;
- l) that many stations operating in the broadcasting service can operate without externally provided power for some time (up to weeks);
- m) that sound and television broadcasting organizations have developed techniques often referred to as “electronic news gathering” for the dissemination of information in programmes called “news bulletins” to inform the public of the extent of disasters and the recovery efforts being undertaken,

recognizing

- a) that the broadcasting infrastructure is actually used to reach several billion people in a short period of time;
- b) that in some countries, such alert systems such as the emergency warning system (EWS) or emergency alert broadcasting have been implemented in which broadcasting stations are connected to governmental or international organizations which issue disaster forecasts;
- c) that a single transmitter operating in the LF, MF and HF frequency bands as well as space stations of the BSS cover large service areas;
- d) that the RR foresee provisions by means of which BSS feeder links subject to Appendix 30A can be converted into FSS links (e.g. for VSAT operations in an emergency area);
- e) that in some cases, a broadcasting station has its own seismometers in the country, analyses the seismic intensities, and voluntarily issues precautions to the public through broadcasts;
- f) that ITU-R has established studies into spectrum usage and users requirements for terrestrial electronic news gathering in Radiocommunication Study Group 6,

noting

that Report ITU-R BT.2299 – Broadcasting for public warning, disaster mitigation and relief, provides a compilation of supporting evidence that broadcasting plays a critically important role in disseminating information to the public in times of emergencies,

recommends

- 1 that responsible agencies should prepare procedures and routines to send information on public warning, disaster mitigation and relief to transmitting or network distribution centres in accordance with agreed technical signal protocols;
- 2 that broadcast transmitters and receivers should be equipped to receive material prepared by the responsible agencies;
- 3 that systems for transmission and reception should include the possibility for forcing suitably equipped and suitably primed receivers (whether switched on or in standby mode) to present programme material for disaster mitigation and relief without intervention from the listener or viewer; so that all citizens can become informed of a possible disaster within the shortest possible period of time; with a robust mechanism against abuse of this feature;
- 4 that for *recommends* 1 to 3, public warning systems on broadcasting as given in Annex 1 may be considered;

5 that for *recommends* 1 to 4, public warning system control signals for analogue broadcasting as given in Annex 2 may also be considered by administrations implementing a public warning system;

6 that in case of public warning, disaster mitigation and relief, broadcasting transmitters should disseminate information advising at a local, national level and/or, potentially, even across national borders as appropriate;

7 that administrations should coordinate where possible with sound and television broadcasting organizations the application of electronic news gathering resources in the disaster area to maximize the potential for using the information gathered in a timely and coordinated fashion to assist the disaster mitigation and relief efforts.

Annex 1

Public warning systems for broadcasting

1 Introduction

This Annex presents an overview of public warning systems in the broadcasting service.

2 Outline of public warning systems for broadcasting

Broadcasters have two functions in disaster management. One is gathering or receiving information from disaster radiocommunication networks connected to administrative organizations. The exclusive line connected to administrative organizations is preferably to be used for urgent alerts and such information as earthquake and tsunami data. The other function is delivering information to the general public. Some municipalities in some countries may have a multicasting system to outdoor receivers with loudspeakers in their own disaster radiocommunication network. However, it may be difficult to hear the sound indoors, especially in bad weather such as storms or heavy rain. Therefore, disaster alerts and information via broadcasting is particularly useful in such situations.

3 Emergency warning system for analogue broadcasting

The system should use relatively simple equipment to ensure stable operations. In an emergency, the EWS control signal, which is an analogue signal, automatically activates the receivers equipped with the EWS function even when they are standby.

Depending on its characteristics, the EWS control signal might also be used as an alarm sound to draw the attention of listeners/viewers to the emergency broadcasting programme. Broadcasters operating analogue platforms can transmit the EWS control signal. The EWS control signal could include an area code as well as a time code, keeping the receiver protected from intentionally fake control signals.

For a specific EWS for analogue sound broadcasting, an EWS control signal as described in Annex 2 is recommended, for automatic activation of receivers compliant with the systems described in Appendix 1 to Annex 1 for public warning, disaster mitigation and relief.

4 Emergency warning system for digital broadcasting

In digital broadcasting, the EWS control signal is transmitted by multiplexing with the broadcast signal. It automatically activates the receivers equipped with the EWS function when they are in standby mode. The EWS control signal should be robust against the abuse of this feature. It is foreseen that digital broadcast receivers will be installed in mobile terminals such as cellular phones, being an effective way to send emergency information to such terminals. Therefore, it would be advantageous for such terminals to be equipped with the EWS function.

Appendix 1 to Annex 1

Examples of public warning systems for broadcasting

1 Introduction

This Appendix presents a system overview and the current status of public warning systems in the broadcasting service in some countries/regions.

2 Emergency Warning System

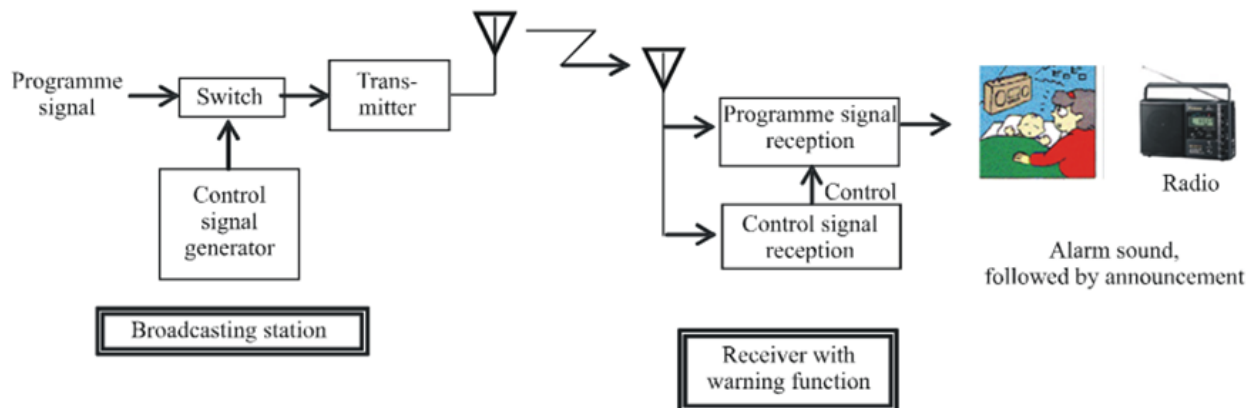
This section describes the Emergency Warning System (EWS), for public warning systems via broadcasting platforms.

2.1 EWS for analogue sound broadcasting

2.1.1 Overview

The composition of a typical emergency warning system is shown in Fig. 1. In an emergency situation, the control signal breaks into the programme signal, to activate the EWS receivers automatically, even when they are in standby mode. The audio level of the control signal is higher than the normal programme signal level. The control signal can also be used for the alarm sound. The system configuration should be simple for quick and reliable activation.

FIGURE 1
Composition of emergency warning system for analogue broadcasting



When the EWS receiver detects the control signal, the alarm will sound, to draw the attention of listeners to the emergency broadcast. The control signal can be transmitted to MW and FM receivers. The control signal includes an area code as well as a time code, thereby protecting the EWS receiver against malicious or fake control signals.

2.1.2 Operation of EWS

The following table shows the two different start signals which can be used according to the emergency situation:

	Example emergency situation	Start signal	Area code
(1)	Large-scale earthquake warning	Category I	Nationwide
(2)	Medium-scale earthquake warning	Category I	Prefecture or wide area
(3)	Tsunami warning	Category II	Nationwide, or regional

Category I activates all EWS receivers in the service area. Category II activates only the relevant EWS receivers.

In cases (1) and (2), broadcasters transmit the Category I start signal. In case (3), broadcasters transmit the Category II start signal, as inland users do not need to evacuate.

After the emergency warning message, broadcasters transmit the end signal, which may be used to return EWS receivers to their previous state.

2.1.3 Specification and configuration of EWS signal

The modulation method of the EWS signal is the frequency shift keying (FSK) method with a space frequency of 640 Hz and a mark frequency of 1 024 Hz. The allowable frequency deviation is plus or minus ten parts per million in each case. The transmission speed of the EWS signal is 64 bits per second and the deviation is ten parts per million. Signal distortion is below 5%. The configurations of the Category I start signal and Category II start signal are shown in Fig. 2, and that of the end signal is shown in Fig. 3.