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Administration and Management

Dissemination Policy NWSPD 10-17

NOAA WEATHER RADIO ALL HAZARDS (NWR) SPECIFIC AREA MESSAGE ENCODING (SAME)

NOTICE: This publication is available at: http://www.nws.noaa.gov/directives/ .

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SUMMARY OF REVISIONS:

This instruction supersedes National Weather Service NOAA Weather Radio (NWR) Specific Area Message Encoding (SAME) dated February 11, 2005.

signed 1/24/06

John McNulty, Jr. Date
Director, Office of Operational Systems

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1. Document Purpose. This instruction describing the format and use of NOAA Weather Radio All Hazards (NWR) Specific Area Message Encoding (SAME) supports NOAA Weather Service's mission "to protect life and property through improved forecast accuracy and area emergency alerts" through effective dissemination of warnings, emergency alerts, and weather information to the public. The instruction also covers NWS organizational responsibilities for SAME.

2. Description. NWR SAME provides an audio dissemination only digital format for location specification of timely warnings and alerts on hazardous event and weather related events and information. Its greatest value is to significantly improve the automatic selection and distribution of messages about events that threaten people and/or property.

2.1 Purpose of SAME. The main purpose of SAME is to facilitate entry of critical information into the National Emergency Alert System (EAS). The SAME six digit identification format allows listeners and EAS participants to filter NWR broadcast of warnings and emergency alerts to receive for subsequent action only messages and information for their selected geographic areas. SAME is used to activate the EAS and to activate specific SAME capable NWR receivers. This format allows listeners and EAS participants to reduce the number of perceived "false" warnings and number of unwanted notifications received in unaffected localities within a larger/regional alert or warning broadcast area (warnings and alerts that are outside the receiver's selected area(s) of concern or that do not match the "listener's" selected SAME geographic area(s), message, event and/or information type codes programmed into the receiver). An additional application of SAME includes automatic system turn "on." This last is a measured criteria in Consumer Electronics Association (CEA) "Public Alert" certified NWR receivers.
(CEA URL http://www.ce.org/PublicAlert)

2.2 History of SAME. In 1985, NOAA's National Weather Service (NWS) began experimenting with special digital codes at the beginning and end of messages concerning life threatening or property damaging events. The intent was to transmit these codes with the broadcast of all NWR messages. This system evolved into what is known today as SAME. Previously, NWS had been using a similar digital approach on its text dissemination services, called the Universal Geographic Code (UGC), with great success. UGC is a geographic and 'product expiration' code used in most event-driven and regularly scheduled NWS text products regardless of text dissemination method. SAME is currently an audio only dissemination protocol used on event-driven products directly related to NWS mission of protection of life and property. The NWR SAME was adopted by NWS for national implementation in 1988, using a shared funding partnership arrangement with users in the local service areas of NWR stations. In 2003, CEA established a commercial standard for "Public Alert" receivers with specific criteria concerning the SAME feature.

2.3 SAME Goals. The goal is to allow greater warning alert selectivity to NWR users and EAS participants as the accuracy of NWS warnings and public alerts increases for all NWR covered broadcast areas.

3. Organizational Responsibilities. This section describes the responsibilities of the NWS Headquarters, Regional Headquarters, and field offices for NWR SAME incorporation and

validation. Additional information on NWR system management responsibilities can be found in the NWS Procedure Directive 10-17 *Dissemination Policy*, NWS Instruction (NWSI) 10-1710, *NOAA Weather Radio Dissemination,* and NWSI 10-1711, *NOAA Weather Radio Management*.

3.1 NWS Headquarters (WSH). The Assistant Administrator (AA) for Weather Services has the overall responsibility for the WSH NWR program of which SAME is a subset. Management of the SAME protocol is split between the Offices of Operational Systems and Climate, Water, and Weather Services.

3.1.1 Office of Operational Systems (OOS). OOS provides staff assistance to the AA for NWR SAME technical specification of the protocol, over-all program management, and configuration control. W/OPS17 is responsible for the NWR network, systems, and equipment.

3.1.2 Office of Climate, Water and Weather Services (OCWWS). OCWWS provides the service requirements and instructions for the message code content and usage of NWR SAME (see NWS Instruction 10-1710, *NOAA Weather Radio Dissemination*). 'Usage' as detailed herein covers event codes, Federal Information Processing System (FIPS) geographic codes, originator information and other areas and information as may be included in the SAME protocol. W/OS51 is responsible for NWS coordination with the Federal Communications Commission (FCC) regarding EAS in order to maintain service compatibility between the NWR and EAS.

3.2 Regional Headquarters. Each regional headquarters manages the message code content and usage of NWR SAME within its region. The Regional Headquarters also coordinates, defines, and documents, in regional supplements as necessary, the "Broadcast Service Areas" for all respective NWR stations (see NWSI 10-1710, section 4.1).

3.3 Field Offices. NWS field office manages the implementation of instructions and guidelines addressed in NWS instructions, regional supplements, and national policies consistent with local service requirements.

4. SAME Coverage Area. SAME coverage areas are defined within the NWR "Broadcast Service Area" (in NWSI 10-1710, section 4.1). SAME location codes address areas within the "NWR Broadcast Service Area" and are comprised of named counties, boroughs, metropolitan areas, portions thereof, as well as bounded and named water areas. NWR "Broadcast Service Area" coverage by State can be found at http://www.nws.noaa.gov/nwr/usframes.html . SAME county codes and respective frequencies can be found by clicking on the representative state at http://www.nws.noaa.gov/nwr/indexnw.htm#sametable .

5. SAME Location Code Update. SAME location codes are updated and announced in Service Change Notice messages giving appropriate advanced notice before implementation (see NWSI 10-1805, *National Service and Technical Change Messages*). Listeners who need to program NWR SAME receivers with the proper county(s) and/or marine area(s) of their choice, can obtain the online information at http://www.nws.noaa.gov/nwr/same.htm#program or by telephone at 1-888-NWR-SAME (1-888-697-7263). Any new or existing SAME location codes not already pre-programmed into

the NWR receiver (and applicable to the listener's needs) should be manually programmed into the NWR receiver according to the manufacturers' instructions.

6. SAME Technical Specifications. Specifications for the NWR SAME message format are detailed in Appendix A, SAME Message Format. For information on SAME code interpretation by receivers, see Appendix B, NWR SAME Receiver Performance Recommendations and Considerations.

APPENDICES

Appendix A NWR SAME Message Format

A.1 SAME Message Format/Elements. The number of event type messages and geographic areas codes NWR SAME can identify is almost unlimited. However, there is a limit of 80 message types disseminated on the EAS because of equipment used by broadcast radio, television, and cable TV systems under FCC rules. There continues to be a self-imposed practical limit on both the NWR and EAS to avoid defining the types of messages too narrowly. Such narrow definition of message types could easily become an unmanageable list that would exceed most consumer equipment resources and the public's ability to program their receivers. EAS rules also limit the number of unique geographic areas that can be included in any one message to 31.

An NWR SAME transmitted data message consists of six possible elements in the following sequence:

1) Preamble
2) Header code
3) Warning Alarm Tone/Attention Signal
4) Voice Message
5) Preamble
6) End Of Message (EOM)

Elements 1, 2, 5, and 6 will always be transmitted in a NWR SAME message and repeated three times. Elements 3 and 4 may or may not be transmitted depending on the specific type of message or its application. A symbolic representation of the message is shown in Section A.2.1.

The coded message is transmitted, using Frequency Shift Keying (FSK), in the NWR audio channel. In this application and the implementation currently used by the FCC EAS, it is more accurate to refer to the code format as Audio Frequency Shift Keying (AFSK). It is transmitted at no less than 80% modulation (± 4.0 kHz deviation minimum, ± 5.0 kHz deviation maximum).

The coded message and voice message are transmitted over the NWR transmitter network using standard pre-emphasis for narrow band VHF Frequency Modulation (FM) of 6 dB per octave increasing slope from 300 Hz to 3,000 Hz applied to the modulator.

A.1.1 Preamble. The preamble and header code are transmitted three times with a one second pause (± 5%) between each coded message burst prior to the broadcast of the actual voice message. Then the preamble and EOM code are transmitted three times with a one second pause (± 5%) between each EOM burst.

A.1.1.1 Preamble Byte. The first 16 bytes (prior to the header code and EOM) of the data transmission constitute a preamble with each byte having the same value of hexadecimal AB (8 bit byte [10101011]). For all bytes, the least significant bit (LSB) is sent first. The bytes following the preamble constitute the actual message data transmission.

> NOTE: For NWR system maintenance, NWS will occasionally send a continuous string of preamble code, hexadecimal AB or a continuous tone through its communications links to the NWR transmitters, for several seconds up to around one minute. This is done to align the NWR program console, communications links, and transmitters for optimum system performance.

A.1.1.2 Bit Definition. The following definitions of a bit are based on a bit period equaling 1920 microseconds (± one microsecond).

1) The data rate is 520.83 bits per second
2) Logic zero is 1562.5 Hz.
3) Logic one is 2083.3 Hz
4) Mark and space bit periods are equal at 1.92 milliseconds.

A.1.2 Header. Each header and EOM data transmission consists of a series string of eight (8) bit bytes similar to standard asynchronous serial communications. However, there are no start, no stop or parity bits. Bit and byte synchronization is attained by a preamble code at the beginning of each header code or EOM data transmission. Data transmissions are phase continuous at the bit boundary. The message data (header) code is transmitted using American Standard Code for Information Interchange (ASCII) characters as defined in ANSI INCITS 4 (rev 86, 2002), with the eighth (8th) bit always set to zero. Each separate header code data transmission should not exceed a total of 268 bytes if the maximum allowable geographic locations (31) are included.

A.1.3 Warning Alarm Tone. The Warning Alarm Tone (WAT), if transmitted, is sent within one to three seconds following the third header code burst. The frequency of the WAT is 1050 Hz (± 0.3%) for 8 to 10 seconds at no less than 80% modulation (± 4.0 kHz deviation minimum, ± 5.0 kHz deviation maximum).

A.1.4 Voice Message. If transmitted, the actual voiced message begins within three to five seconds following the last NWR SAME code burst or WAT, whichever is last. The voice audio ranges between 20% modulation (± 1 kHz deviation) and 90% modulation (± 4.5 kHz deviation) with occasional lulls near zero and peaks as high as, but not exceeding, 100% modulation (± 5.0 kHz deviation). Total length of the voice message should not exceed two minutes.

A.1.5 Preamble. A repeat of A.1.1.1 above.

A.1.6 End Of Message. EOM is identified by the use of “NNNN.”

A.2 MESSAGE CODE FORMAT / PROTOCOL

A.2.1 Symbolic Form

(Preamble) ZCZC-ORG-EEE-PSSCCC-PSSCCC+TTTT-JJJHHMM-LLLLLLLL-
(one second pause)
(Preamble) ZCZC-ORG-EEE-PSSCCC-PSSCCC+TTTT-JJJHHMM-LLLLLLLL-
(one second pause)
(Preamble) ZCZC-ORG-EEE-PSSCCC-PSSCCC+TTTT-JJJHHMM-LLLLLLLL-
(one to three second pause)
1050 Hz Warning Alarm Tone for 8 to 10 seconds - (if transmitted)
(three to five second pause)
Voice /spoken oral text of message - (if transmitted)
(one to three second pause)
(Preamble) NNNN
(one second pause)
(Preamble) NNNN
(one second pause)
(Preamble) NNNN

A.2.2 Symbol Definitions. NOTE: The use of " " is for clarity and emphasis purposes only. They are not part of the NWR SAME message structure.

A.2.3 (Preamble). Preamble was previously covered under A.1.1.

A.2.4 "ZCZC". This header code block is the identifier, sent as ASCII characters ZCZC to indicate the start of the ASCII header code data transmission.

A.2.5 "-"(Dash). This "Dash" is sent following each type of information code block in the header except prior to the message valid time.

A.2.6 "ORG". The Originator header code block (ORG) indicates who initiated the message. The only originator codes are:

ORIGINATOR	ORG CODE
Broadcast station or cable system	EAS
Civil authorities	CIV
National Weather Service	WXR
Primary Entry Point System	PEP

A.2.7 "EEE". The Event header code block (EEE) identifies the type of Event and information contained in the Voice message, if a Voice message is sent. Section 6 of this document lists the approved Event codes. The Event code may be sent with or without a WAT

or Voice message as an alerting function only. It also may be sent as a control code for some NWR system control functions.

A.2.8 "PSSCCC". The Geographical Area header code block (PSSCCC) identifies the geographic area affected by the NWR SAME message. Each location code uniquely identifies a geographical area. A message may contain up to 31 Geographical Area blocks.

A.2.8.1 "P". The "P" in the Geographical Area header code block allows for subdividing the area defined by the "CCC" into smaller parts in the case of a very large or uniquely shaped area, or because of widely varying height, climate, or other geographic features. An area can be divided into 2 to 9 subdivisions. Area subdivisions may be of unequal size, and will be designed to cover the entire "CCC" area without overlap. Area subdivisions must be defined and agreed to by the local officials prior to use (e.g., NWS office in coordination with local EAS plan participants and customers). In the absence of a local process or procedure to address and define subdivisions, paragraph 11.21 of FCC Part 11, Emergency Alert System (March 7, 2003), should be used as guidance.

"P" must be in the range of 0 (zero) to 9. Valid values of "P" for a particular area depend on the number of subdivisions created and defined for that area - a county divided into two parts will have three valid numbers (P=0,1 and 2). In all cases, if "P"= 0, it means the entire or unspecified area defined by "CCC" is affected. If "P" equals a number other than zero, a subdivision of the area defined by "CCC" is affected. Some examples of notional subdivisions are presented in the following table:

"P"	2 Subdivisions	3 Subdivisions	5 Subdivisions	9 Subdivisions
0	Entire A-county	Entire B-county	Entire C-county	Entire D-county
1	East A-county	Mountain above [x elevation]	Northeast C-county	Northwest D-county
2	West A-county	Mountain below [x elevation]	Northwest C-county	North Central D-county
3		Valley portion	Central C-county	Northeast D-county
4			Southeast C-county	West Central D-county
5			Southwest C-county	Central D-county
6				East Central D-county
7				Southwest D-county
8				South Central D-county
9				Southeast D-county

A.2.8.2 "SS". The State, Territory and Offshore (Marine Area) portion (SS) of the Geographical Area header code block is the number associated with the state, territory, or offshore (Marine Areas) as defined by the Federal Communication Commission (FCC) Report and Order released February 26, 2002. The authoritative source of state and territory codes to be used in this field is Federal Information Processing Standard (FIPS) 6-4, Counties and

Equivalent Entities of the United States, Its Possessions, and Associated Areas, dated 31 Aug 1990, incorporating all current Change Notices [refer to: http://www.itl.nist.gov/fipspubs/fip6-4.htm]. Refer to the following Internet URL for the listing of Marine Area "SS" codes–

http://www.nws.noaa.gov/geodata/catalog/wsom/html/marinenwreas.htm

The corresponding files are available in the table row titled "Coastal & Offshore Marine Area & Zone Codes, including Marine Synopses, for NWR (NOAA Weather Radio)". Click on the "Download Compressed Files" link to view or retrieve the most recent data set.

A.2.8.3 "CCC". The "CCC" in the Geographical Area header code block identifies a county, province, or major metropolitan area within the United States and its territories. A "CCC" of 000 applies to the entire state or area identified in the "SS" section of the code. The FIPS Publication (PUB) 6-4, published by the National Institute of Standards and Technology, U.S. Department of Commerce, is a reference for FIPS codes used in this field. The authoritative source of codes to be used in this field is FIPS 6-4, Counties and Equivalent Entities of the United States, Its Possessions, and Associated Areas, dated 31 Aug 1990, as amended, with all current Change Notices [refer to: http://www.itl.nist.gov/fipspubs/fip6-4.htm].

Refer to the following Internet URL for the listing of Marine Area "CCC" codes–

http://www.nws.noaa.gov/geodata/catalog/wsom/html/marinenwreas.htm

The corresponding files are available in the table row titled "Coastal & Offshore Marine Area & Zone Codes, including Marine Synopses, for NWR (NOAA Weather Radio)". Click on the "Download Compressed Files" link to view or retrieve the most recent data set.

IMPORTANT NOTES Regarding the "PSSCCC" Code Block:

1) The Geographical Area header code block transmitted over NOAA Weather Radio (NWR) frequencies, but ORIGINATED INITIALLY by security or communications centers at special hazardous materials storage or production facilities, may contain a combination of numbers, letters, and other characters. These become special location codes containing a combination of geographic and instructional information to activate customized receivers, pre-stored text messages, and/or other special equipment.

The authorized ASCII character set for these special location codes is restricted to decimal 10 ("new line") and 13 ("carriage return"); and decimal 33 ("!") through 127 ("delete") excluding ASCII characters decimal 43 ("+") and 45 ("-"). ASCII characters decimal 43 and 45 may not be part of this six character header code block, but used only at the end of the block as shown

previously in the symbolic form. The ASCII character decimal 42 ("*"), is reserved for use as a wild card only.

2) Special location codes WILL NOT be sent as part of NWS originated NWR SAME messages. NWR receivers with SAME decoders should not respond to such codes for NWR or EAS purposes. Specially designed receivers are required to receive the special location codes. Systems receiving NWR broadcasts and providing further redistribution may want to pass them along in any retransmission of the header code. Radio, television or cable systems covered by FCC Rules Part 11 are not prohibited from using these codes in peripheral equipment or ancillary functions to basic EAS equipment to further enhance the safety of the public in cooperation with local government officials or facility managers.

3) An NWR or EAS text standard over and above this special application of the location code is not defined under these specifications or EAS rules. A text standard could be developed using the basic NWR SAME EAS protocol, but identified as a text message using a variation of the Originator code. The Originator Code in this section is reserved for voice messages only and decoders should reject any messages that do not match this currently defined code set.

4) Numbers from 900 to 999 in the CCC segment of the Geographical Area header code block are reserved for assignment to unique non-FIPS defined alerting areas adjacent to facilities that store or produce nuclear, chemical and biological material.

A.2.9 "TTTT". The Purge time header code block (TTTT) identifies the purge time of the message expressed in a delta time from the issue time in 15 minute segments up to one hour, then in 30 minute segments beyond one hour up to six hours; i.e. +0015-, +0030-, +0045-, +0100-, +0430-, +0600-. This delta time, when added to the issue time, specifies when the message is no longer valid and should be purged from the system, not to be used again. It is important to note that the valid or purge time of the message will not always equal the event expiration time. For most short-term events such as tornadoes and severe thunderstorms, the two times will most often be identical. For longer duration events such as a hurricane or winter storm that may not end for many hours or days, the valid time in the code only applies to that message, and is not an indicator when the threat is over. This block is always preceded by "+".

A.2.10 "JJJHHMM". This header code block identifies the Julian Calendar date and the time the message was originally disseminated in hours and minutes using the 24 hour Coordinated Universal Time (UTC) clock.

A.2.11 "LLLLLLLL". This header code block identifies the originator of the message, or in the case of the EAS, that of a station re-broadcasting the message. NWS offices use the International Civil Aviation Organization (ICAO) location identifiers (first four letters), e.g., KDTX/NWS for Detroit, MI, and KTOP/NWS for Topeka, KS. Radio and television station's use the stations call sign such as KFAB/AM or WDAF/FM.

A.2.12 "NNNN". This code block is the End Of Message (EOM) code.

A.3 MESSAGE EXAMPLES

Three examples of a TORNADO warning (TOR) are provided in subsections A.3.1, A.3.2 and A.3.3. This will allow readers to see the variance in the message construction. Other examples include; Regular Weekly Test (RWT) Message (A.3.4), a non-critical message – Special Weather Statement (A.3.5), a special NWR SAME code message to the transmitter (A.3.6), and a test message format for NWS personnel (A.3.7)

A.3.1 Most Common Code Transmission with Critical Voice Warning Message

(Preamble [16 bytes]) ZCZC-WXR-TOR-039173-039051-139069+0030-1591829-
KCLE/NWS-
(one second pause)
(Preamble [16 bytes]) ZCZC-WXR-TOR-039173-039051-139069+0030-1591829-
KCLE/NWS-
(one second pause)
(Preamble [16 bytes]) ZCZC-WXR-TOR-039173-039051-139069+0030-1591829-
KCLE/NWS-
(one to three second pause)
(Warning Alarm Tone Transmitted for eight to ten seconds)
(three to five second pause)
(Voice text of the Tornado Warning Message)
(one to three second pause)
(Preamble [16 bytes]) NNNN
(one second pause)
(Preamble [16 bytes]) NNNN
(one second pause)
(Preamble [16 bytes]) NNNN

This example is a tornado warning for Wood, Fulton, and northwest Henry counties in Ohio and valid for 30 minutes from the issue time of 1829 UTC (which was 2:29 PM local time) on the 159th day of the Julian Calendar, from the National Weather Service office in Cleveland, OH.

NOTE: A visual message for television or special display for the deaf could be created by a small microprocessor and appear as shown below.

> "THE NATIONAL WEATHER SERVICE OFFICE IN CLEVELAND OHIO HAS ISSUED A TORNADO WARNING EFFECTIVE UNTIL 3 PM EDT FOR PEOPLE IN THE FOLLOWING COUNTIES IN OHIO ... WOOD ...FULTON...AND NORTHWEST HENRY." (Some pre-stored call to action and a recommendation to monitor TV or another special source could be included.)

A.3.2 Code Transmission of Critical Voice Message with No Warning Alarm Tone

(Preamble [16 bytes]) ZCZC-WXR-TOR-039173-039051-139069+0030-1591829-
KCLE/NWS-(one second pause)
(Preamble [16 bytes]) ZCZC-WXR-TOR-039173-039051-139069+0030-1591829-
KCLE/NWS-(one second pause)
(Preamble [16 bytes]) ZCZC-WXR-TOR-039173-039051-139069+0030-1591829-
KCLE/NWS-
(NO Warning Alarm Tone Transmitted)
(three to five second pause)
(Voice text of the Tornado Warning Message)
(one to three second pause)
(Preamble [16 bytes]) NNNN
(one second pause)
(Preamble [16 bytes]) NNNN
(one second pause)
(Preamble [16 bytes]) NNNN

This example is a message broadcast over the NWR. It is intended for retransmission by an FCC Emergency Alert System (EAS) Local Primary (LP) radio and/or television station where the event threatens an area outside of the service area of the NWR, but is covered by the LP and other stations in the service area of the NWR. Users with analog WAT type NWR receivers will not be alerted and those with NWR SAME decoder receivers would likely not have those geographical areas programmed in their units and if they did it would be because they wanted to be alerted.

NOTE: A visual message for television or special display for the deaf could be created by a small microprocessor and appear as shown below.

"THE NATIONAL WEATHER SERVICE OFFICE IN CLEVELAND OHIO HAS ISSUED A TORNADO WARNING EFFECTIVE UNTIL 3 PM EDT FOR PEOPLE IN THE FOLLOWING COUNTIES IN OHIO ... WOOD ...FULTON...AND NORTHWEST HENRY."
(Some pre-stored call to action and a recommendation to monitor TV or another special source could be included.)

A.3.3 Transmission of Critical Event Code, but with No Warning Alarm Tone or Voice Message

(Preamble [16 bytes]) ZCZC-WXR-TOR-039173-039051-139069+0030-1591829-
KCLE/NWS-
(one second pause)
(Preamble [16 bytes]) ZCZC-WXR-TOR-039173-039051-139069+0030-1591829-
KCLE/NWS-
(one second pause)
(Preamble [16 bytes]) ZCZC-WXR-TOR-039173-039051-139069+0030-1591829-
KCLE/NWS-

(NO Warning Alarm Tone Transmitted)
(NO Voice Message Broadcast)
(one to three second pause)
(Preamble [16 bytes]) NNNN
(one second pause)
(Preamble [16 bytes]) NNNN
(one second pause)
(Preamble [16 bytes]) NNNN

This is an example of a special NWR SAME code only broadcast. It is intended for re-transmission by an FCC Emergency Alert System (EAS) Local Primary (LP) radio and/or television station for the purpose of notifying other stations in the EAS web and emergency management officials outside the coverage of the NWR station. In the application of this example, the event threatens a location outside the service area of the NWR, but is covered by the LP. Users with analog WAT type NWR receivers will not be alerted and those with NWR SAME decoder receivers would not likely have those areas programmed in their units. If they did, it would be because they did want to be alerted. The use of this method over the NWR will be rare, to solve a very unique problem, and confined to more rural areas.

NOTE: A visual message for television or special display for the deaf could be created by a small microprocessor and appear as shown below.

"THE NATIONAL WEATHER SERVICE OFFICE IN CLEVELAND OHIO HAS ISSUED A TORNADO WARNING EFFECTIVE UNTIL 3 PM EDT FOR PEOPLE IN THE FOLLOWING COUNTIES IN OHIO ... WOOD ...FULTON...AND NORTHWEST HENRY."
(Some pre-stored call to action and a recommendation to monitor TV or another special source could be included.)

A.3.4 Code Transmission and Associated Message For Required Weekly Test

(Preamble [16 bytes]) ZCZC-WXR-RWT-020103-020209-020091-020121-029047-029165-
029095-029037+0030-3031700-KEAX/NWS-
(one second pause)
(Preamble [16 bytes]) ZCZC-WXR-RWT-020103-020209-020091-020121-029047-029165-
029095-029037+0030-3031700-KEAX/NWS-
(one second pause)
(Preamble [16 bytes]) ZCZC-WXR-RWT-020103-020209-020091-020121-029047-029165-
029095-029037+0030-3031700-KEAX/NWS
(one to three second pause)
(Warning Alarm Tone transmitted for eight to ten seconds)
(three to five second pause)
(Brief Voice text of the weekly test describing the service provided, area covered, and application of the warning alarm tone and NWR SAME code)
(one to three second pause)
(Preamble [16 bytes]) NNNN
(one second pause)

(Preamble [16 bytes]) NNNN
(one second pause)
(Preamble [16 bytes]) NNNN

This is an example of a Required Weekly Test (RWT) of the NWR, WAT, and NWR SAME that covers the Kansas City metro area. It was transmitted at 1700 UTC (11:00AM CST) on the 303rd day of the Julian Calendar, from the National Weather Service office located at Pleasant Hill, MO.

NOTE: Some NWS offices are more active participants in the local operational areas of the Federal Communications Commission's (FCC) Emergency Alert System (EAS) by periodically initiating the Required Monthly Test. These tests normally coincide with the time the NWS conducts its routine weekly tests. In these cases, the RWT code for Required Weekly Test will be replaced with the code, RMT, for the Required Monthly Test. No other NWR test using the RWT code for that week would be conducted.

A.3.5 Transmission of Non-Critical Event Code with No Warning Alarm Tone, But With a Voice Message

(Preamble [16 bytes]) ZCZC-WXR-SPS-039173-039051-139069+0030-1591829-
KCLE/NWS-
(one second pause)
(Preamble [16 bytes]) ZCZC-WXR-SPS-039173-039051-139069+0030-1591829-
KCLE/NWS-(one second pause)
(Preamble [16 bytes]) ZCZC-WXR-SPS-039173-039051-139069+0030-1591829-
KCLE/NWS-
(NO Warning Alarm Tone Transmitted)
(one to three second pause)
(Voice message of the Special Weather Statement)
(one to three second pause)
(Preamble [16 bytes]) NNNN
(one second pause)
(Preamble [16 bytes]) NNNN
(one second pause)
(Preamble [16 bytes]) NNNN

This is example of a non-critical message broadcast (Special Weather Statement) over the NWR with the NWR SAME code, and not intended for the EAS. Its primary use would be for recording and playback by automated or unattended radio stations, redistribution by other service providers such as pagers, along with a wide variety of other applications.

Special Note: The use of this coded message for routine, non-critical messages (e.g., forecasts, weather roundups and climate summaries, among others as illustrated in this example) is not yet in use. When implemented, the code will precede the "initial" or "update" of nearly all its messages broadcast over the NWR.

NOTE: A visual message for television or special display for the deaf could be created by a small microprocessor and appear as shown below.

"THE NATIONAL WEATHER SERVICE OFFICE IN CLEVELAND OHIO HAS ISSUED A TORNADO WARNING EFFECTIVE UNTIL 3 PM EDT FOR PEOPLE IN THE FOLLOWING COUNTIES IN OHIO ... WOOD ...FULTON...AND NORTHWEST HENRY." (Some pre-stored call to action and a recommendation to monitor TV or another special source could be included.)

A.3.6 Transmission of a System Control Code But With No Warning Alarm Tone or Voice Message

(Preamble [16 bytes]) ZCZC-WXR-TXB-039173+0030-1591829-KCLE/NWS-
(one second pause)
(Preamble [16 bytes]) ZCZC-WXR-TXB-039173+0030-1591829-KCLE/NWS-
(one second pause)
(Preamble [16 bytes]) ZCZC-WXR-TXB-039173+0030-1591829-KCLE/NWS-
(NO Warning Alarm Tone Transmitted)
(NO Voice Message Broadcast)
(one to three second pause)
(Preamble [16 bytes]) NNNN
(one second pause)
(Preamble [16 bytes]) NNNN
(one second pause)
(Preamble [16 bytes]) NNNN

This is an example of a special NWR SAME code. It is broadcast only to control equipment served by the NWS WFO in Cleveland. In this case, it is an instruction to the NWR system located in state/county number 039173 (Wood County, Ohio) to switch to the backup transmitter.

A.3.7 Code Transmission and Associated Message for a Demonstration, Operational Staff or Other Type Exercise

(Preamble [16 bytes]) ZCZC-WXR-DMO-999000+0030-1561634-KEAX/NWS-
(one second pause)
(Preamble [16 bytes]) ZCZC-WXR-DMO-999000+0030-1561634-KEAX/NWS-
(one second pause)
(Preamble [16 bytes]) ZCZC-WXR-DMO-999000+0030-1561634-KEAX/NWS-
(one to three second pause)
(***1050 Hz Warning Alarm Tone NOT transmitted***. However, for realism, a non-alerting tone at another frequency might be transmitted for eight to ten seconds)
(one to three second pause)
(Brief Voice text of a message describing the reason for the interruption in normal service to someone who may have been coincidentally listening to the standard weather broadcast and the warning alarm tone and NWR SAME code)

(one to three second pause)
(Preamble [16 bytes]) NNNN
(one second pause)
(Preamble [16 bytes]) NNNN
(one second pause)
(Preamble [16 bytes]) NNNN

This example has three types of applications. Its primary use is to provide NWS field office personnel a means of conducting exercises to practice issuing authentic warnings and other critical messages without disrupting the EAS network or turning on industrial and general public receiver decoders, unless optionally selected by the user. The event code "DMO" should not normally be programmed into receivers or EAS decoder and the location code of "999000" does not match any existing or future geographical area codes.

Another application of this type of code transmission is to demonstrate over the air in real time how NWR SAME and/or the EAS could be used. A NWR SAME receiver or EAS decoder could be set up to respond to the "DMO" event and "999000" location code. When the code is transmitted, only that unit would respond providing a realistic demonstration.

A third use is as a maintenance aid to align/test the NWR SAME communications link; or check newly installed or repaired NWR receiver or EAS decoders at EAS media facilities, cable television hubs, or similar facilities that have specialized needs or will redistribute to other users. To thoroughly test the system, the user programs in the event code "DMO" and location code "999000", and sets the receiver decoder or other equipment to perform the desired task. When the NWS sends the code as shown in the example, the system should be able to perform the desired task at the receive site. If a more detailed test is required, the receive site can program the actual desired event code, but use the location code "999000". After that test, the receive site could program in event code "DMO" and the desired location code. None of these three code transmissions should cause any other equipment to respond since they should not have the "DMO" and "999000" combination or the "999000" combined with any other event or a real location code paired with the event code "DMO". At the conclusion of the demonstration/test, the receive site should program only the desired event pair and location codes and remove the "DMO" event and "999000" location codes.

A.4 EVENT CODES

A.4.1 NWR-SAME / EAS Weather Related Events

NATURE OF ACTIVATION	NWR-SAME CODE	SPANISH TRANSLATION
Blizzard Warning	BZW	Aviso de ventisca
Coastal Flood Watch	CFA	Vigilancia de inundaciones costeras
Coastal Flood Warning	CFW	Aviso de inundaciones costeras
Dust Storm Warning	DSW	Aviso de vendava
Flash Flood Watch	FFA	Vigilancia de inundaciones relámpago

Flash Flood Warning	FFW	Aviso de inundación
Flash Flood Statement	FFS	Advertencia de inundaciones relámpago
Flood Watch	FLA	Vigilancia de inundación
Flood Warning	FLW	Aviso de inundación
Flood Statement	FLS	Advertencia de inundación
High Wind Watch	HWA	Vigilancia de vientos fuertes
High Wind Warning	HWW	Aviso de vientos fuertes
Hurricane Watch	HUA	Vigilancia de hurracán
Hurricane Warning	HUW	Aviso de hurracán
Hurricane Statement	HLS	Advertencia de hurracán
Severe Thunderstorm Watch	SVA	Vigilancia de tronada severa
Severe Thunderstorm Warning	SVR	Aviso de tronada severa
Severe Weather Statement	SVS	Advertencia de tiempo severo
Special Marine Warning	SMW	Aviso especial de la Marina
Special Weather Statement	SPS	Advertencia especial del estado del tiempo
Tornado Watch	TOA	Vigilancia de tornado
Tornado Warning	TOR	Aviso de tornado
Tropical Storm Watch	TRA	Vigilancia de tormenta tropical
Tropical Storm Warning	TRW	Aviso de tormenta tropical
Tsunami Watch	TSA	Vigilancia de tsunami
Tsunami Warning	TSW	Aviso de tsunami
Winter Storm Watch	WSA	Vigilancia de tormenta de nieve
Winter Storm Warning	WSW	Aviso de tormenta de nieve

A.4.2 NWR SAME / EAS Non-Weather Related Events

A.4.2.1 National Codes – Required for FCC regulated broadcast stations

NATURE OF ACTIVATION	NWR-SAME CODE	SPANISH TRANSLATION
Emergency Action Notification [1]	EAN	Anuncio de acción urgente
Emergency Action Termination [1]	EAT	Fin de acción urgente
National Information Center [1]	NIC	Mensaje del National Information Center
National Periodic Test [1]	NPT	Prueba periódica nacional
Required Monthly Test	RMT	Prueba mensual obligatoria
Required Weekly Test	RWT	Prueba semanal obligatoria

A.4.2.2 State and Local Codes – Optional for FCC regulated broadcast stations

NATURE OF ACTIVATION	NWR-SAME CODE	SPANISH TRANSLATION
Administrative Message	ADR	Advisory Mensaje administrativo
Avalanche Watch	AVA	Watch Vigilancia de avalancha

Avalanche Warning	AVW	Aviso de avalancha
Child Abduction Emergency	CAE	Emergencia de rapto de menores
Civil Danger Warning	CDW	Aviso de peligro civil
Civil Emergency Message	CEM	Mensaje de emergencia civil
Earthquake Warning	EQW	Aviso de terremoto
Evacuation Immediate	EVI	Evacuación inmediata
Fire Warning	FRW	Aviso de inundaciones incendio
Hazardous Materials Warning	HMW	Aviso de materiales peligrosos
Law Enforcement Warning	LEW	Aviso de las autoridades de la ley
Local Area Emergency	LAE	Emergencia de área local
911 Telephone Outage Emergency	TOE	Interrupción telefónica 911
Nuclear Power Plant Warning	NUW	Aviso de riesgo nuclear
Radiological Hazard Warning	RHW	Aviso de peligro radiológico
Shelter In Place Warning	SPW	Aviso de refugio
Volcano Warning	VOW	Aviso de actividad volcánica

A.4.2.3 Administrative Events

NATURE OF ACTIVATION	NWR-SAME CODE	SPANISH TRANSLATION
Network Message Notification	NMN	Anuncio de mensaje en red
Practice/Demo Warning	DMO	Práctica/Demostración

A.4.3 NWR SAME / Non-EAS Event Codes

These NWR control codes are unique to the National Weather Service for use in remotely controlling NWR transmitters. These codes are not intended to be implemented on NWR SAME-capable receivers.

These codes are not included in the EAS per the Amendment of Part 11 of the FCC Rules, as presented in the EAS Report and Order released February 26, 2002, which became effective May 16, 2002.

NATURE OF ACTIVATION	NWR-SAME CODE	SPANISH TRANSLATION
Transmitter Carrier Off	TXF	Frecuencia portadora de emission desactivada
Transmitter Carrier On	TXO	Frecuencia portadora de emisión activada
Transmitter Backup On	TXB	Transmisor de respaldo activado
Transmitter Primary On	TXP	Transmisor principal activado

Section A.4 Footnotes:

(Note 1) These codes are for use by the Federal Communications Commission (FCC) and the Federal Emergency Management Agency (FEMA) for distribution of national messages over the EAS. It is unlikely in the near future the NWS will INITIATE the transmission of these codes over the NWR. These codes, however, may be retransmitted over the NWR where EAS equipment is installed on a NWR program line and the NWR system is serving as an EAS Local Primary (LP) station.

A.5 EVENT CODE CATEGORIES

With the exception of TOR (Tornado Warning), SVR (Severe Thunderstorm Warning), and EVI (Evacuation Immediate) identified in the previous section and the NWR control codes, the third character in all existing and future event codes is limited as follows:

1) W for Warning
2) A for Watch
3) E for Emergency
4) S for Statement

A.5.1 Warning - those events that alone pose a significant threat to public safety and/or property, probability of occurrence and location is high, and the onset time is relatively short.

A.5.2 Watch - meets the classification of a warning, but either the onset time, probability of occurrence or location is uncertain.

A.5.3 Emergency - An event that by itself would not kill or injure or do property damage but indirectly may cause other things to happen that result in a hazard. Example, a major power or telephone loss in a large city alone is not a direct hazard but disruption to other critical services could create a variety of conditions that could directly threaten public safety.

A.5.4 Statement - a message containing follow up information to a warning, watch, or emergency.

Appendix B NWR SAME Receiver Performance Recommendations and Considerations

B.1 NWR SAME Receiver/Decoders' Use Of the Partition Part of the Location Code

NWR SAME receiver decoders should be designed so that if the unit has a partition in the geographical area (location) code stored for processing (e.g. 129139), it will respond to a transmitted code from the NWS that has only the zero in the partition part of the location code, (e.g. 029139). The zero signifies ALL or an unspecified part of the coded location, therefore, for safety purposes, the decoder should respond to the zero partition code because the zero implies that the partitioned area is potentially affected. On the other hand, if the receiver/decoder unit uses a default of zero in the partition part of the location code (e.g. 029139), it should respond to any transmitted partitioned location code that otherwise matches the "SS" and "CCC" part of the code (e.g. 129139). The use of the zero in the receiver/decoder location code implies the user wants to be alerted for an event anywhere within the geographical area defined by the location code.

In the future, NWR SAME codes may appear on the initial broadcast or update of routine type messages such as forecasts, weather roundups, climate summaries, statements, river, lake, and tide stages among others. Equipment at radio stations could, for example, capture just the Voice part of a forecast or weather roundup, store it, and then play it back at scheduled times or as needed for event driven messages such as special statements.

B.2 Requirement to Decode a Discrete Event and Location Pair

For industrial, commercial, and especially EAS type applications, any alerting or activation process should be conditional on matching a discrete pair of specific event and a specific location code. Except in the most basic and simple application in consumer type products, decoders should avoid having a table of event codes and a separate table of location codes. For example, an event table consists of: TOR, FFW, CFW, and SMW. The location table includes: 033001, 033005, 033011, 075709, and 075711.

In this arrangement, the system will respond if any transmitted code is in the event table and in the location table. Users will often need to have the ability for the system to respond to a TOR for 033001 and 033005 but not from 033011, however, it needs a FFW for 033011, but not for 033005. Therefore, a single lookup or matching table should be created so each event is paired with a discrete location, (e.g. [TOR\033001], [TOR\033005], [FFW\033011], [CFW\033005], [SMW\075711], and [SMW\075709]).

Consumer type equipment may be able to use a two table approach versus discrete pairs because the interest or need for information for any hazardous event will likely be confined to just one or possibly two location codes reducing the number of receiver activations by as much as 80 to 90 percent. Otherwise, there would be little advantage of

having a NWR SAME decoding unit if the user is interested in many events for a large area.

B.3 Code Error Checking

For best receiver decoder performance it is recommended that a software algorithm confirm that at least two of the three header code transmissions are identical before declaring a match or valid code and performing the preprogrammed task. If this test fails, do a bit-by-bit check of the three transmissions and attempt to reconstruct a valid code by comparing the bits in each position in each header code transmission and accepting as the valid bit that bit which appears in two of the three header code transmissions.

B.4 End Of Message Decode

For NWR SAME applications, a valid End-Of-Message (EOM) does not need to be conditional on the receipt of all four N's in three separate bursts. For NWR SAME applications, an EOM can be considered valid if the decoder detects the preamble followed by at least one, but preferably two (2) N's. The preamble and any number of N's will never be sent except at the end of the message.

B.5 Multiple Messages

NOAA Weather Radio Receivers (with and without the SAME function) should be able to receive and disseminate messages at the rate they are broadcast from the NWR transmitter. Higher priority messages that may be sent immediately following a routine or scheduled NWR transmission should not degrade the previous message or cause those contents to be lost.

B.6 Plain Language Text Messages Produced From the Header Code

Devices that create a plain language text message from the header code should pay special attention to the definition of the "+TTTT-" part of the code described in Section 4.2.7. Any text message should avoid the implication that the EVENT defined by the “EEE" part of the header code expires at the time determined by the issue time plus the delta time defined by the "+TTTT-" part of the header code. Wording similar to the following would be a more accurate statement especially for longer term events and would also apply to short fused events as well by substituting the appropriate time from the "+TTTT-" part of the header code: " THIS EVENT IS EXPECTED TO LAST FOR AT LEAST 6 HOURS OR LONGER. PLEASE STAY TUNED FOR MORE DETAILS." If the unit has a real time clock and enough processing and storage capacity to calculate a time, the message might read as follows regardless of the "+TTTT-": "THIS EVENT IS EXPECTED TO LAST UNTIL AT LEAST HH:MM OR LONGER. PLEASE STAY TUNED FOR MORE DETAILS."

If the text message is expected to be read by someone without access to hearing the NWR or other media voice broadcasts, the second sentence should use language directing them to an appropriate alternate source.

B.7 External DC Power Source

NWR SAME receiver/decoders should be equipped with a suitable connector so it can be powered from an external 12 VDC source for operation away from commercial power outlets. This would allow the unit to be powered by car, truck, boat, or camper 12 VDC power systems through a source such as a cigarette lighter receptacle. A typical 9 VDC internal emergency backup battery, though desirable during loss of commercial power, may not power the unit in a continuous monitoring mode for more than a few hours when removed from commercial power. This would reduce the value of the radio as a warning device for people in remote, vulnerable situations.

B.8 Recognition of Non-NWS Originator Code

NWR SAME receiver/decoders should be offered to consumers that also accept and process any messages broadcast over the NWR with any EAS authorized originator codes. In addition to the WXR that identifies the NWS as an originator, it should include codes listed in the FCC Report and Order dated February 26, 2002: PEP for the Primary Entry Point System, CIV for Civil Authorities, and EAS for Broadcast stations or cable systems. The NWR is evolving into a more comprehensive local, state, regional and national warning system in keeping with its objective as an "All Hazards" source of information. A few NWR transmitter sites are currently equipped with EAS devices to support the critical warning needs of unique hazardous material storage or production facilities. In the future, the NWS may allow for the expanded installation of these types of EAS devices to support state and local distribution of non-weather related emergency messages through the NWR and as a means to enter the EAS network. These messages could be potentially as important to owners of NWR receivers as a weather related message. Even though the message may be originally disseminated over the NWR, it would not originate from the NWS and therefore not have a WXR origination code. To ensure owners of NWR receivers receive the maximum protection possible from the system, NWR-SAME receivers should accept any originator code.

B.9 Receiver Tests

The NWS tests the NWR and SAME alerting technology weekly. These tests normally occur on Wednesday between 10 AM and 12 noon local time with some variations to accommodate local requirements. Some NWS offices actively participate in the local operational areas of the FCC EAS by periodically initiating the Required Monthly Test. These tests normally coincide with the time the NWS conducts its routine weekly tests. In these cases, the RWT code for Required Weekly Test will be replaced with the code, RMT, for the Required Monthly Test. No other NWR test using the RWT code for that week would be conducted. These tests are postponed to the next good weather day if

threatening weather is occurring or possible at or near the time of the routine or scheduled test.

All types of NWR-SAME compatible receivers should respond to these tests in some form. There are two basic methods from which there are several variations. The first method is for the receiver to display a message or have some other visual indication the unit has successful been tested. Another approach is for the unit to notify the user only when the unit's internal software suspects an error.

Use of the visual positive and/or routine display of a successful test should not be based on the valid time of the message in the header. This is normally set to 15 minutes because that is the minimum time the NWR system will accept. The system should not purge for upwards of 12 hours. This would allow for those not able to observe the test (i.e. working outside the home) to see that the receiver has been successfully tested. A purge time of 12 hours would ensure the largest number of people being able to acknowledge the test. Any real message for the area programmed in the receiver would automatically replace the test message.

The other method of testing the unit would occur after the receiver has not received a test message, RWT or RMT, or another code associated with a real event within some time frame. For example, if the unit does not receive a valid event code for a real event or test within, say 8 or 9 days (192/216 hours), the unit would display a message to check the receiver. Both of the above suggestions should be based on the receiver getting a valid RWT, RMT or another event code associated with a real message, and one of the geographic codes programmed in the receiver. The NWS sends all the geographic codes that apply to the service area of the monitored transmitter with each test message. The receiver should check to ensure at least one of the transmitted geographic codes matches one of those programmed in the unit. If it does not, then the unit should inform the user there may be something wrong. Just having the receiver acknowledge receipt of "a" or "any" code string would not be enough.

It is important to note that the event code DMO is not intended to be used as part of any routine testing. The event code DMO is to be used only as described in Appendix A.

If an output is provided to activate external alarms, i.e. strobe light, siren, pillow shaker, etc., at a minimum, a manual test capability that can be used to activate the output should be provided. A more elegant manual receiver test would include the internal generation of NWR SAME code sequences using the user programmed Event and Location codes in the receiver.

Information on Consumer Electronic Association “Public Alert” NWR receivers and specification can be found at http://www.ce.org/publicalert.