

Strengthening the Emergency Alert System (EAS): Lessons Learned from the Nationwide EAS Test

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I. EXECUTIVE SUMMARY

On November 9, 2011, at 2:00 p.m. Eastern Standard Time (EST), the Federal Communications Commission (“FCC” or “Commission”) and the Federal Emergency Management Agency (“FEMA”) conducted the first-ever nationwide test of the Emergency Alert System (“EAS”). Thousands of broadcasters, cable operators, and other EAS Participants¹ took part in the test, which involved the simultaneous receipt and broadcast of a live national EAS alert to all EAS Participants across the United States and its territories. The purpose of the test was to allow the FCC and FEMA to assess how the national EAS architecture would perform in practice, and to develop and implement any necessary improvements to ensure that the EAS, if activated in a real emergency, would perform as designed. The test was the result of approximately two years of planning and preparation, involving the FCC, FEMA and other Federal agencies, EAS Participants and their organizations, state and local governments, consumer groups and organizations representing people with disabilities.

Prior to the test, the Commission completed a rulemaking to set the ground rules for the test and authorized the Public Safety and Homeland Security Bureau (PSHSB or Bureau) to implement the test’s operational details. The Bureau subsequently issued a series of public notices apprising EAS Participants of the test’s requirements. In coordination with FEMA and industry stakeholders, the Bureau conducted extensive outreach to ensure that all EAS Participants were aware of the test and the operational details concerning their participation, and that the test would not cause any public confusion. The Bureau also created a database that would allow EAS Participants to file their required reports electronically, and would facilitate the Bureau’s analysis of the test’s results. The Bureau received and analyzed test result data from over 16,000 EAS Participants, and held discussions with EAS Participants, FEMA and other EAS stakeholders to analyze the test’s results. This report summarizes the lessons learned from the test and the Bureau’s recommendations for strengthening the EAS.

Overall, a large majority of the EAS Participants successfully received the Emergency Action Notification (EAN), the live code for the national EAS, and, if required, retransmitted the EAN to other EAS Participants. The test demonstrated that the national EAS distribution architecture is basically sound. As expected, however, the test uncovered several problems that impeded the ability of some EAS Participants to receive and/or retransmit the EAN. These included:²

- Widespread poor audio quality nationwide;
- Lack of a Primary Entry Point (PEP) in the area to provide a direct connection to FEMA;
- Use of alternatives to PEP-based EAN distribution;
- The inability of some EAS Participants either to receive or retransmit the EAN;
- Short test length; and
- Anomalies in EAS equipment programming and operation.

¹ The EAS uses the transmission facilities of radio and television broadcast stations, cable operators, satellite radio and television service providers, and wireline video service providers (collectively referred to as “EAS Participants”). See 47 C.F.R. §11.2(c).

² Following a request from the Alaska Department of Homeland Security, the FCC granted Alaska EAS Participants a rule waiver to excuse their performance in the Nationwide EAS Test due to severe weather conditions. Alaska’s non-participation had minimal impact on the test because FEMA and the FCC received EAS data from Alaska as a result of the two preliminary EAS tests FEMA and the FCC conducted there in 2010 and 2011. Notwithstanding this waiver and as indicated below, Alaska did provide some data in connection with the November 9, 2011 test, which data was used to develop the aggregate analyses contained in this report.

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The Bureau recommends that another nationwide test be conducted after the Commission takes a number of steps to strengthen the EAS, including:

- 1) Commencing a rulemaking proceeding to examine equipment performance issues during activation of an EAN and seek comment on proposed changes, if any, to the EAS equipment rules to ensure that EAS equipment operates in a consistent fashion throughout the EAS architecture.
- 2) Issuing a Public Notice encouraging states to review and as necessary update their EAS plans to ensure that they contain accurate and up-to-date information regarding monitoring assignments as required by FCC rules.
- 3) Commencing a rulemaking proceeding to consider possible changes to its EAS plan rules.
- 4) Working with FEMA to develop and issue best practices and other educational materials for EAS Participants, and, also with FEMA, consider hosting a workshop or other public forum that could provide opportunities to educate EAS Participants about EAS performance and address concerns and questions EAS Participants may have about EAN operations.

Turning to the issue of nationwide EAS testing, the Bureau recommends that the Commission take the following actions:

- 1) Commencing a rulemaking proceeding to address any operational nationwide EAS test issues left open in previous EAS orders, such as a possible nationwide location code for national EAS activations, use of the National Periodic Test code or other test code that would allow FEMA and the FCC to conduct less disruptive nationwide tests; and future use of the EAS Operation Handbook.
- 2) Developing a new Nationwide EAS Test Reporting System database to improve electronic filing of test result data by EAS Participants.
- 3) Encouraging the Executive Office of the President to reconvene the Federal EAS Test Working Group to ensure accountability as Federal partners and other stakeholders work to implement the lessons learned from the first test and to plan for future nationwide tests.

II. INTRODUCTION

On November 9, 2011, at 2:00 p.m. Eastern Standard Time (EST), the FCC and FEMA conducted a nationwide test of the EAS. This event marked the first time the EAS (or its predecessor the Emergency Broadcast System (EBS)) had been tested on a nationwide basis. The test involved the simultaneous receipt and broadcast of a live national EAS alert by thousands of broadcasters, cable operators and other media-based communications service providers across the United States and its territories.

The purpose of the test was to allow FEMA and the FCC to assess whether the national EAS would perform as designed, if activated. The FCC and FEMA used this test, diagnostic in nature, to assess the performance of the national EAS architecture and, to the extent the system did not perform as designed, take corrective actions to ensure that the system functions as intended.

This test was the result of approximately two years of planning and preparation involving the FCC, FEMA, the National Oceanic and Atmospheric Administration (NOAA) (and its component agency the National Weather Service (NWS)), the Executive Office of the President, EAS Participants and their industry associations, state and local governments and their organizations, consumer groups and organizations representing people with disabilities. These efforts included development of a test plan and live code EAS tests in the State of Alaska, an FCC proceeding to adopt rules governing nationwide EAS tests, and various FEMA-FCC outreach efforts targeting EAS Participants, state and local governments and consumers.

On November 9, 2011, FEMA successfully initiated the Emergency Action Notification (EAN), the live code used for Presidential activations of the nationwide EAS.³ The Bureau subsequently has collected and analyzed thousands of reports, including some that came in as recently as November 2012, held discussions with FEMA and other stakeholders to analyze the data contained in these reports, and participated in webinars and other fora where we discussed best practices that would help address some of the issues uncovered by the test.

The EAN was successfully distributed throughout the majority of the system and overall, a large majority of EAS Participants successfully received the EAN, and, if required, retransmitted the EAN to other EAS Participants. Accordingly, the FCC and FEMA concluded that the nationwide EAS distribution architecture is basically sound. As anticipated, however, this first ever diagnostic test also revealed a number of problems that impeded the ability of some EAS Participants to receive and/or retransmit the EAN. Although one problem, poor audio at the Primary Entry Point (PEP) level,⁴ may have affected EAN distribution in some areas of the country, most problems were localized to equipment at individual EAS Participants. To the extent such problems occurred high in the distribution chain,⁵ other EAS

³ The EAN is followed by an audio transmission of Presidential Messages. See 47 C.F.R §§ 11.13, 11.44. Only the President may issue an EAN for a Presidential alert, and no President has ever done so.

⁴ Primary Entry Point (PEP) Stations are private or commercial radio broadcast stations that cooperatively participate with FEMA to provide emergency alert and warning information to the public prior to, during, and after incidents and disasters. The FEMA PEP stations also serve as the primary source of initial broadcast for a Presidential or National EAS message. This select group of geographically distributed, independently powered, and electromagnetic pulse (EMP) hardened radio stations collectively can reach over 90% of the American populace.

⁵ The EAS is distributed among the broadcasters, cable providers and other EAS participants by a broadcast-based, hierarchical architecture commonly known as the EAS “Daisy Chain.” This distribution architecture is described in detail in section III.A, *infra*.

Participants were affected. In this report, we discuss these problems and offer recommendations for actions the FCC should take to address them as well as next steps in advance of another nationwide test.

III. BACKGROUND

A. The Emergency Alert System Architecture and the Need for Nationwide Testing

The EAS is designed primarily to provide the President with the capability to communicate via a live audio transmission to the public during a national emergency.⁶ The EAS is the successor to prior national warning systems: Control of Electromagnetic Radiation (CONELRAD), established in 1951; and the EBS, established in 1963.⁷

The type of national emergency that would justify a Presidential EAS alert would be a catastrophic event, where access to electrical power and communications systems may be significantly degraded or even eliminated. Under such conditions, the one communications media platform likely to continue operating is broadcast radio, accessible from battery powered consumer receiver sets and other means, such as car radios and hand-cranked radios. Accordingly, the EAS was designed to provide a simple live audio feed from the President, delivered initially to PEP radio stations. As indicated below, other EAS Participants receive and, in turn, transmit the alert via the hierarchical broadcast-based EAS distribution system to consumers.

The FCC, in conjunction with FEMA and the NWS, implements EAS at the federal level.⁸ The respective roles these agencies play are defined by a 1981 Memorandum of Understanding between FEMA, NWS and the FCC;⁹ a 1995 Presidential Statement of EAS Requirements;¹⁰ and a 2006 Executive Order.¹¹ As a general matter, the Commission, FEMA and NWS all work closely with radio and television broadcasters, cable providers, and other EAS Participants and stakeholders – including state, local, territorial and tribal governments – to ensure the integrity and utility of the EAS.

⁶ See Review of the Emergency Alert System, *Second Further Notice of Proposed Rulemaking*, 25 FCC Rcd at 564, 565, ¶ 2 (2010).

⁷ CONELRAD was not an alerting system *per se*, but was rather a Cold War emergency system under which most radio and television transmission would be shut down in case of an enemy missile attack to prevent incoming missiles from homing in on broadcast transmissions. The radio stations that were allowed to remain on the air, the CONELRAD stations, would remain on the air to provide emergency information. See “Defense: Sign-off for CONELRAD,” *Time Magazine*, Friday, July 12, 1963.

⁸ FEMA acts as Executive Agent for the development, operation, and maintenance of the national-level EAS. See *Memorandum*, Presidential Communications with the General Public During Periods of National Emergency, The White House (September 15, 1995) (*1995 Presidential Statement*).

⁹ See 1981 State and Local Emergency Broadcasting System (EBS) Memorandum of Understanding among the Federal Emergency Management Agency (FEMA), Federal Communications Commission (FCC), the National Oceanic and Atmospheric Administration (NOAA), and the National Industry Advisory Committee (NIAC), reprinted as Appendix K to Partnership for Public Warning Report 2004-1, *The Emergency Alert System (EAS): An Assessment*.

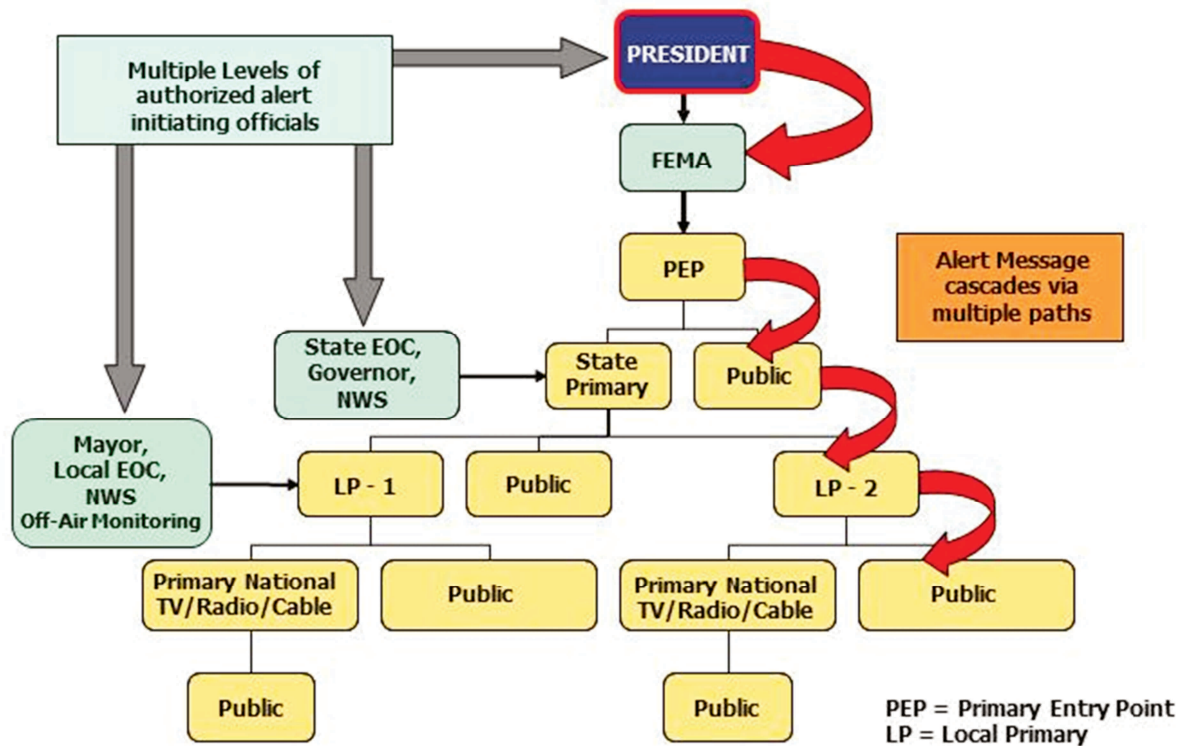
¹⁰ See *1995 Presidential Statement*.

¹¹ See *Public Alert and Warning System*, Exec. Order No. 13407, 71 Fed. Reg. 36975 (June 26, 2006) (*Executive Order*).

FCC rules require EAS Participants to have the capability to receive and transmit Presidential alerts disseminated over the EAS, and generally govern all aspects of EAS participation.¹² A Presidential alert has never been issued, and prior to November 9, 2011, the national alerting capability of the EAS had never been tested. Although EAS Participants also voluntarily transmit thousands of alerts and warnings issued annually by the NWS and state, tribal, and local governments, these alerts typically address severe weather threats, child abductions, and other local emergencies. As discussed in more detail below, non-Presidential EAS alerts do not require that EAS Participants open a live audio feed from the alerting source, but rather deliver alerts with prerecorded messages that can be delivered at the discretion of the EAS Participant, rendering non-Presidential alerts (and their related testing procedures) inappropriate for the test of a national alert.¹³

As illustrated below, the EAS architecture is designed to cascade the EAN through a pre-established hierarchy of broadcast, cable, and satellite systems:

Figure 1. EAS Architecture



¹² See 47 C.F.R. Part 11.

¹³ The EAS was subject to a patchwork of testing regimes that assessed components of the EAS, but not the national EAS as a whole. For example, under FCC rules, EAS Participants are subject to weekly and monthly EAS testing at the state and/or local level. FEMA regularly tests the connectivity between it and PEP stations. Meanwhile, NWS tests its own National Weather Radio (NWR) facilities independently or as integrated with state and local emergency alert delivery architectures. Finally, state officials maintain and test their own state Emergency Operations Centers. As the Commission noted in February 2011, none of these operations involve top-to-bottom national testing of the EAS architecture and thus “may not expose vulnerabilities in functioning or gaps in nationwide coverage of the EAS.” See Review of the Emergency Alert System, EB Docket No. 04-296, *Third Report and Order*, 26 FCC Rcd 1460, 1465 ¶ 9 (2011) (*Third Report and Order*).

FEMA initiates a nationwide, Presidential alert using specific encoding equipment to send a special code, the EAN,¹⁴ to the PEPs over a secure telephone (wireline) connection. Upon receipt of the code, the PEPs open a live audio channel to FEMA and broadcast the EAN throughout their listening areas. A group of selected EAS Participants in each PEP's broadcast area, known as Local Primary (LP) stations, monitor these PEP stations. When LP stations receive the EAN, they begin to buffer the audio message and re-broadcast the EAN and audio message in their listening areas. The remaining broadcasters, cable television facilities and other EAS Participants located in each LP's broadcast footprint receive the EAN alert from the LP stations, and in turn, begin to buffer and re-broadcast the EAN alert and audio message to the public (or in the case of cable, to customers' set top boxes). Once this process is complete (which can take approximately 40 seconds), all EAS Participants are broadcasting the audio message from the President across the entire nation.¹⁵ Each EAS Participant's EAS designation and monitoring assignment is described in state EAS plans, which are developed voluntarily by State Emergency Communications Committees (SECCs), volunteer committees usually comprised of state broadcasters and state emergency management officials. The SECCs make technical and operational recommendations to state and local area authorities involved in emergency communications, write EAS plans for their state, serve as liaison with the FCC' and maintain liaison with appropriate industry committees at the national, state and local levels.¹⁶

B. The Road to the First Nationwide EAS Test

The road to the first nationwide EAS test began in the summer of 2009 when FCC Chairman Julius Genachowski instructed PSHSB to conduct a 30-Day Review on FCC Preparedness for Major Public Emergencies. In a September 2009 report,¹⁷ the Bureau noted that concerns had been raised regarding the frequency and scope of EAS testing, and recommended that the three Federal agencies responsible for the

¹⁴ The EAN and other EAS codes are part of the Specific Area Message Encoding (SAME) protocol used both for the EAS and NOAA weather radio. See National Weather Service, "NOAA Weather Radio All Hazards," available at <http://www.nws.noaa.gov/nwr/same.htm> (last accessed March 28, 2013).

¹⁵ Many LP stations also play a primary role in distributing state-originated EAS alerts, and in that context they are known as State Primary (SP) or State Relay (SR) stations. EAS Participants that are not monitored by other EAS Participants but solely broadcast the alert to the public are known as Participating Nationals (PN). At the time of the November 9, 2011 test, FCC rules permitted EAS Participants to be categorized as Non-Participating Nationals (NN). NNs were not required to participate in national alerts but instead were required to go off the air if an EAN were issued. Under FCC rules, NNs were required to maintain EAS equipment and participate in weekly and monthly tests of the EAS. Because it was far easier for NNs to participate in the Nationwide EAS Test than to go off the air, most NNs chose to participate in the Nationwide EAS Test as PNs. In January 2012, the Commission eliminated the NN category in its EAS Fifth Report and Order as a technically obsolete holdover from the older EBS alerting system. See *Review of the Emergency Alert System; Independent Spanish Broadcasters Association, the Office of Communication of the United Church of Christ, Inc., and the Minority Media and Telecommunications Council, Petition for Immediate Relief; Randy Gehman Petition for Rulemaking*, Fifth Report and Order, EB Docket No. 04-296 (rel. Jan. 12, 2012) (*Fifth Report and Order*). We collected data from NNs only to the extent that they took part in the test.

¹⁶ See *Amendment of Part 73, Subpart G, of the Commission's Rules Regarding the Emergency Broadcast System*, Report and Order and Further Notice of Proposed Rulemaking, 10 FCC Rcd 1786, 1834 (1994) (*First Report and Order*).

¹⁷ See *FCC Preparedness for Major Public Emergencies Chairman's 30 Day Review*, prepared by the Public Safety and Homeland Security Bureau (Sept. 2009) (*Chairman's Review*) at 24, available at <http://www.fcc.gov/document/chairman-genachowskis-thirty-day-public-safety-review-fcc-preparedness-major-public-emergen> (last accessed March 28, 2013).

EAS – the FCC, FEMA and NWS – review the testing regime to see where improvement could be made.¹⁸ In response, the FCC, FEMA, NWS and the Executive Office of the President convened a working group to plan and conduct nationwide testing of the EAS. As an initial step, in January 2010 and again in January 2011, FEMA, along with the FCC, the State of Alaska, and EAS Participants in Alaska, conducted limited live testing of the EAS in Alaska. FEMA, the FCC and other Federal agencies used the results of those tests to develop a test plan for the first nationwide EAS test.

In February 2011, the FCC adopted rules that authorized nationwide EAS testing, and established basic procedures for conducting the initial nationwide test. Specifically, the rules required all communications service providers that are required to participate in the national EAS also to participate in nationwide testing of the EAS. In this regard, the FCC's rules required EAS Participants to receive and, if required, transmit the EAS and to submit test result data to the Commission within 45 days following the nationwide test. On June 9, 2011, FEMA and the FCC announced that the first nationwide test would take place on November 9, 2011 at 2:00 p.m. EST.¹⁹

From January 2011 through November 9, 2011, FEMA, the FCC and the EAS community conducted an extensive outreach campaign directed at EAS Participants, state and local governments and consumers. These efforts were designed to prepare EAS Participants for the test and to resolve technical and operational issues as appropriate and to educate state and local governments, including 911 Call Centers, and consumers about the test as well as the EAS in general. Examples of these activities included:

- FCC and FEMA-conducted webinars, roundtables and other meetings with EAS Participants to discuss EAS best practices and FCC EAS requirements and to resolve outstanding technical and operational issues, as needed;
- FCC and FEMA release of EAS test handbooks, an EAS Best Practices Guide, and toolkits designed to educate EAS Participants about the nationwide test and how to prepare for it;
- FCC development of an electronic system to facilitate filing of EAS test result data by EAS Participants;
- A joint FEMA-FCC letter to state governors as well as FCC and FEMA newsletter blurbs, webinars and other activities directed at state and local government agencies regarding the Nationwide EAS Test;
- FCC newsletter blurbs, emails to list serves, and/or meetings targeting consumer organizations, including organizations representing people who do not speak English as well as groups representing the deaf and hard of hearing and other disabilities;
- Joint FCC and FEMA meetings with organizations representing the deaf and hard of hearing to address their concerns regarding the test;
- Production of video and audio FCC public service announcements (PSAs), in English and Spanish, with open and closed captioning, regarding the nationwide EAS test;
- Voluntary dissemination of PSAs and production of other consumer outreach materials by the National Association of Broadcasters, National Cable and Telecommunications Association and other broadcast and cable industry participants for airing on local broadcast radio and television and cable television systems;

¹⁸ *Id.*

¹⁹ Public Safety and Homeland Security Bureau Announces that First Ever Nationwide Diagnostic Test of the Emergency Alert System will Occur on November 9, 2011 at 2 PM EST, EB Docket No. 04-296, *Public Notice*, 26 FCC Red 8398 (PSHSB 2011).

- Voluntary airing of public service announcements (with open and/or closed captioning) by approximately 100 national and regional broadcast and cable television networks immediately before and/or after the Nationwide EAS test, alerting viewers that they were about to see or had seen the nationwide EAS test;
- Voluntary development by EAS Participants and their industry organizations of an on-air slide that indicated “This is ONLY A TEST.” This provided additional visual information to viewers;²⁰ and
- FCC and FEMA consumer factsheets to provide basic information to consumers about the test. Both agencies made these documents available on their respective websites and through the FCC Consumer Call Center.

Because the test involved the first-ever simultaneous broadcast of a live EAS alert over most media-based communications services nationwide, there was a potential for consumer confusion and panic. To mitigate this concern, both FEMA and the FCC targeted significant outreach efforts to consumers and worked with organizations such as the National Emergency Number Association and the Association of Public Safety Communications Officials to educate 911 Call Centers about the test. These efforts proved effective as neither FEMA nor the FCC received reports of increased calls to 911 as a result of the test.

IV. NATIONWIDE EAS TEST RESULTS

A. Overview

The overwhelming majority of EAS Participants reported that they received the EAN. Broadcasters, the largest segment of EAS Participants and the primary conduit for EAN distribution, reported widespread successful propagation of the EAN nationwide, a result corroborated by cable operators and other EAS Participants, who experienced similar success. That said, as discussed in more detail below, several technical issues affected the distribution of the EAN system-wide, including difficulties arising from the audio quality issues of FEMA’s transmission to the PEPs; failures at three PEP stations that resulted in their inability to retransmit the EAN to other EAS Participants; and dependence by states that lacked a PEP station or effective alternative means to receive the EAN, for example satellite-based options such as the National Public Radio (NPR) “Squawk Channel”.²¹ Other EAS Participants experienced individualized problems arising from equipment function, programming, user error, or the brevity of the test message.

B. Breakdown of Test Performance by EAS Participant Category

Table 1 provides an overview of the performance of EAS Participants according to their designation within the EAS hierarchy. For purposes of this report, all cable operators fall into the Participating National category.

²⁰ Some EAS Participants noted that there would be some limitations in their ability to provide such backdrop visual information. For example, a slide announcing “This is only a test” would not appear on some cable systems during the test. Also, the test would be conducted only in English.

²¹ In addition to AM, FM, and broadcast radio stations, FEMA has designated Sirius XM Satellite, the Hawaii Emergency Operations Center, and NPR as PEPs. With respect to NPR, from its Washington, D.C.-based Network Operations Center, NPR distributes the EAN to public radio stations via the NPR Squawk Channel. Some State EAS Plans designate the NPR Squawk Channel as an alternative monitoring source to the PEP from which EAS Participants may receive an EAN. See n.31 *infra.* for an explanation of the NPR Squawk Channel.

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Table 1. EAS Participants' Receipt of EAN based on EAS Designation²²

EAS Designation	Stations		Receipt of EAN			
Broadcasters	Total Stations	%	Success	%	Failure	%
National Primary (PEP) ²³	62 ²⁴	0.43%	59	95%	3	5%
State Primary	94	1%	79	84%	15	16%
State Relay	724	5%	606	84%	118	16%
Local Primary 1 (LP1)	916	7%	756	83%	160	17%
Local Primary 2 (LP2)	720	5%	580	81%	140	19%
Participating National	10,753	78%	9,026	84%	1,727	16%
Non-Participating National	301	2%	219	73%	82	27%
Unidentified	217	2%	176	81%	41	19%
Total Broadcasters	13,787		11,501	83%	2,286	17%
Cable Operators	Headends					
Participating National	2,944 ²⁵		2,160	73%	784	27%
All Total	16,731²⁶		13,661	82%	3,070	18%

²² Although the Commission received thousands of reports from EAS Participants, many entities did not submit the required filings. The deadline for filing these reports was December 27, 2011. Since that time, the Bureau has reached out, primarily through industry organizations including the National Association of Broadcasters, the National Cable and Telecommunications Association, and the American Cable Association, to encourage those EAS Participants that had not filed their mandatory reports to do so. As a result of this effort, PSHSB received numerous additional filings in November 2012. However, there are a significant number of EAS Participants that still appear not to have filed the required reports. Accordingly, the Bureau plans to confirm cases of continued non-filers and refer them to the Enforcement Bureau for possible further action.

²³ The National Primary numbers include three non-broadcaster PEPs: Sirius XM Satellite, the Hawaii Emergency Operations Center, and NPR.

²⁴ As noted earlier in this report, *see note 2, supra*, due to an ongoing severe weather storm in occurring in Alaska during the test, the Alaska Department of Homeland Security requested that the EAN test not be broadcast in Alaska so that the channels there could be used in the event that the EAS was needed to broadcast a local weather alert. FEMA had anticipated that severe weather might affect actual test performance in certain areas and therefore designed the test to accommodate the potential impact to the testing caused by Alaska's absence from the test. Although the Alaska PEP received and recorded the EAN from FEMA, they did not broadcast it and Alaska was granted a waiver and was not required to file a report. Accordingly, Table 1, which is based on reports filed, shows 62 PEPs rather than the 63 that were in operation on November 11, 2011.

²⁵ This category includes wireline video service providers in addition to traditional cable operators.

²⁶ Under FCC rules, the Commission treats test result data submitted by EAS Participants as presumptively confidential. Accordingly, for purposes of Table 1, we provide aggregated test result data to the extent doing so does not result in disclosure of confidential information. As discussed in n.33, *infra*, we do not provide EAN receipt data for two EAS Participants and do not include them among the 16,731 total number of filings. The omission of this data does not change the assessment of the test in any significant way.

1. National Primary (PEP) Stations

At the time of the test, there were a total of 63 PEP stations in operation.²⁷ According to FEMA, all 63 stations had a functioning connection to the FEMA-PEP conference bridge, which, as discussed above,²⁸ connects the FEMA Operations Center to the PEP stations through the Public Switched Telephone Network (PSTN) to enable simultaneous transmission of the EAN from FEMA to the PEPs.²⁹ FEMA reported that it successfully activated the EAN at 2:00 p.m. EST and transmitted the EAN to all 63 PEP stations. According to FEMA, three of the PEP stations did not broadcast the EAN received from FEMA, and the Alaska PEP received and recorded the EAN but did not broadcast as previously discussed. According to FEMA, equipment at each of the non-Alaskan PEP stations (*i.e.*, the stations that did not plan to omit the broadcast element of the test) has been repaired or replaced and these PEP stations have reported successful connection to FEMA during subsequent internal tests.

2. Local Primary Stations (LPs)

The Commission's rules require LP stations to monitor the PEPs for propagation of the EAN throughout any given state. Many State EAS Plans³⁰ also provide alternate sources for EAN monitoring by EAS Participants, including the NPR Squawk Channel,³¹ which distributes the EAN to public radio stations via satellite. In most State EAS Plans, LP stations serve as the primary source for disseminating the EAN below the PEP level. LP stations are monitored by other EAS Participants, including broadcast, cable, and satellite providers that the State EAS Plan does not otherwise designate with some other characterization (such as LP). Most LP stations reported successful receipt of the EAN. Of approximately 1,636 LP stations filing mandatory reports, 1,336, or 82%, reported successful receipt of the EAN, while 300, or 18%, reported that they did not receive the EAN.

²⁷ FEMA has made a major commitment to increasing the number of PEPs (and by extension the effectiveness of the EAS) from the original 33 broadcast radio stations that comprised the PEP system to the 63 PEPs at the time of the test. FEMA intends to increase this number to 77 by 2015, and thus cover over 90 percent of the US population solely through the PEP system. See <http://www.fema.gov/primary-entry-point-stations> (last accessed March 28, 2013).

²⁸ See section III.A, *supra*.

²⁹ Unlike the rest of the EAS distribution architecture, which is primarily broadcast-based, the dissemination of the EAN to the PEPs by FEMA is done over this PSTN link. FEMA has indicated that it is completing installation and configuration of a satellite communications network to all PEP stations that will add a more capable and direct communications channel to the PEPs while maintaining the terrestrial telephone network connectivity.

³⁰ State EAS Plans describe procedures for state emergency management and other state officials, the National Weather Service and EAS Participants' personnel to transmit emergency information to the public during a state EAS activation. Under the Commission's rules, these plans should include information regarding monitoring assignments and the specific primary and backup path for the EAN from the PEP station. State EAS Plans must be reviewed and approved by the Chief, PSHSB. 47 C.F.R. § 11.21.

³¹ The NPR Squawk Channel is designed to deliver important news advisories and other timely information to stations carrying NPR News. It allows producers to instantly communicate information (by voice) about upcoming breaking news and live event coverage, including changes in program format and start and end times. See National Public Radio, at <http://www.npr.org/euonline/pub/squawk.htm>.

3. Participating Nationals

Most EAS Participants are designated as Participating Nationals (PNs). The EAS Participants receive the EAN from LP stations and broadcast it to the public. Of the 13,697 PNs that filed test reports, 82% successfully received the EAN and delivered it to their customers.

C. Performance by Classes of EAS Participant

1. Broadcasters

Broadcasters constitute the largest group of EAS Participants. Of the 13,784 broadcast stations that submitted test result data, approximately 83%, or 11,498 broadcasters, reported successful receipt of the EAN.

2. Cable Providers and Wireline Video Service Providers

Cable providers and wireline video service providers constitute the second largest EAS Participant group. Cable service providers were required to file test data per headend, and each cable system may have several cable headends.³² Of the 2,944 cable headends that filed test report data, approximately 73% reported successful receipt of the EAN and 27% reported they did not receive the EAN.

3. Satellite Systems

Test results varied among satellite system service providers, but in most cases, causes for any failure were identical to those that affected broadcast and cable.³³

V. EQUIPMENT PERFORMANCE

Most EAS equipment functioned as designed, generating or receiving the EAN as required. Some EAS equipment, however, performed in varying ways, due to differences in how manufacturers interpreted rules in designing this equipment.³⁴ During the test, most of this equipment functioned as designed, generating or receiving the EAN as required. As a result, the test data revealed anomalies such as EAN delay and inconsistent text crawl language.

VI. MOST SIGNIFICANT LESSONS LEARNED

The Nationwide EAS Test revealed a number of problems associated with EAS performance. Post-test reports indicate that the problems fall into seven broad categories: poor audio quality; lack of a PEP station, problems with the use of alternatives to the PEPs, inability to receive the EAN; inability to retransmit the EAN (or deliver the EAN to the public); short test length; and issues associated with the programming of EAS equipment. This section will discuss each of these problems.

³² A cable television headend is a master facility for receiving television signals for processing and distribution over a cable television system.

³³ This report does not include tabulated data on the performance of direct broadcast satellite service (DBS) providers that participated in the test. Because there were only two such participants, the Bureau is concerned that doing so could disclose confidential information.

³⁴ See section VI.G, *infra*.

A. Widespread Poor Audio Quality Nationwide

As discussed earlier, FEMA reported that it transmitted the EAN to all 63 PEP stations.³⁵ Many EAS Participants noted widespread audio quality problems across the nationwide EAS hierarchy. FEMA attributed this poor audio quality to “[a] technical malfunction [that] occurred at the National Primary level that introduced a second set of EAN headers into the system. This affected the audio quality for many downstream stations and in some cases, resulted in duplicated messages or muted the audio test message.”³⁶ FEMA has since informed the Bureau that it has taken the following actions to address this problem:

- Correcting the FEMA PEP technical configurations to eliminate message duplication;
- Testing and deploying a two-way satellite network to improve connectivity and audio quality between the FEMA Operations Center (FOC) and all PEP stations;
- Working with PEP EAS device manufacturers to correct potential technical anomalies that may cause message repeat, attenuation and impedance issues;
- Working with its FOC and the telephone bridge manufacturer to upgrade the system to prevent any accidental return and repeat of audio during an EAN event; and
- Continuing to test FEMA PEP network and equipment twice weekly.

B. Lack of PEP Station

At the time of the test, FEMA had not established a PEP in Portland, Oregon.³⁷ The Oregon EAS Plan directed Oregon EAS Participants west of the Cascades, (in Portland, for example), to monitor KOPB-FM, a Portland-based Public Broadcasting Service radio station that would receive the EAN from the NPR Squawk Channel. According to press reports, the audio quality of the EAN that KOPB received from FEMA via the NPR Squawk Channel was poor,³⁸ and the station received a second set of EAN alert tones within seconds after it received the initial EAN alert tones (caused by the feedback loop discussed earlier). Further, equipment at the station rejected the Washington, D.C. location code that was used for the test, and this terminated the alert partway through the transmission.³⁹ Thus, most of the state’s EAS Participants were unable to broadcast a complete EAN, and anyone listening for the alert heard only the first few seconds of the test. FEMA has now expanded its PEP coverage in Oregon to include both Eugene and Portland,⁴⁰ and, according to personnel at Oregon Public Broadcasting, all equipment issues have been resolved. Accordingly, any future EAN should propagate effectively throughout Oregon, whether from a PEP or through the NPR Squawk Channel. Also, as we recommend below, the Commission should initiate a proceeding to consider adoption of a national location code for any future nationwide EAS test as well as for an actual national alert.

³⁵ <http://www.fema.gov/emergency-alert-system-eas> (last accessed March 28, 2013).

³⁶ *Id.*

³⁷ See <http://www.rwonline.com/article/walden-national-test-proved-eas-'sort-of'-works/24851> (last accessed March 28, 2013).

³⁸ See, e.g. <http://www.kval.com/news/national/133545908.html> ("Emergency Alert System Didn't Work in Oregon") (last accessed March 28, 2013).

³⁹ *Id.*

⁴⁰ Oregon State Plan dated December 31, 2012.

C. Problems with the Use of Alternatives to PEP-Based EAN Distribution

During the run-up to the test, FEMA and PSHSB determined that there were some instances where EAS Participants intended to use alternatives to the broadcast-based daisy chain architecture to receive the EAN. Various test results and further discussions with FEMA have raised concerns that some of these alternatives may not be able to receive the EAN effectively. PSHSB will continue to work with FEMA and EAS stakeholders to examine this issue. In the meantime, we remind SECCs that state EAS plans should specify where alternatives to the broadcast-based "daisy chain" architecture are being used and that, as required by FCC rules, EAS Participants should seek FCC approval to use such alternatives.⁴¹ Further, state EAS plans should require that their state's PEP connection to the rest of EAS Participants be tested on a regular basis.

D. Inability to Receive the EAN

The vast majority of EAS Participants received the EAN from the stations they were assigned to monitor, either at the PEP level or from stations located below the PEP level. For example, Texas broadcasters informally reported that out of the 1,252 Texas radio and TV stations that participated in the Nationwide EAS Test, only 22, less than 2 percent, failed to receive the EAN despite monitoring the sources required by the EAS participant's state EAS plan. There is no one cause for these failures, but to the extent that EAS Participants were aware of reasons that they did not receive the EAN, reasons included user error during the test, errors in programming equipment for the test, and mechanical anomalies related to the test's use of a Washington, D.C. location code.

E. Inability to Retransmit the EAN and/or Deliver the Alert to the Public

Some EAS Participants reported that, although they were able to receive the EAN, they could not broadcast it to viewers or listeners. In many cases, this was due to user error during the test or in programming the equipment. Other EAS Participants or EAS Participant organizations reported that some stations successfully received the EAN from both primary monitoring sources, but that the audio portion of the EAN was so severely garbled that the equipment could not retransmit it to other EAS Participants for broadcast to the public, and that the EAN from the NPR Squawk Channel contained duplicate EAN tones that may have triggered the EAS equipment to terminate the alert.

F. Short Test Length

Two EAS Participants reported an inability to deliver the EAN to the public due to the short 30-second duration of the test. One EAS Participant reported that its EAS equipment cannot rebroadcast an EAN shorter than 75 seconds. As a result, while it apparently received the EAN, it could not retransmit it to subscribers. Another EAS Participant suggested that the 30-second duration of the test was insufficient to allow its engineers to manually override its equipment when automatic equipment functions failed.

G. Anomalies in EAS Equipment Programming and Operation

In designing and/or programming EAS equipment, manufacturers have made certain inconsistent assumptions about the requirements of the EAS rules. As a result, alerting information was not processed or retransmitted in a uniform manner throughout the EAS system, which caused certain problems. For example, several EAS Participants reported that there was a three minute delay in their rebroadcast of the EAN.

⁴¹ See 47 CFR § 11.52(d)(4).

On December 15, 2011, Monroe Electronics, an EAS equipment manufacturer, filed an *ex parte* letter stating that its equipment initiated EAN transmission at 2:03 p.m. (rather than at the scheduled time of 2:00 p.m.) because the EAN's header "time of transmission" code was set for 2:03 p.m. In designing its equipment Monroe Electronics interpreted the Commission's EAS rules to require that it follow each code element in the EAS header.⁴² Other manufacturers' equipment is programmed to override the "time of transmission code" when an EAN is received. Monroe raised the issue of whether the EAS rules should require EAS equipment to automatically synchronize receipt of EAS alerts with their dissemination, so that the EAS Participant would disseminate an EAS alert at the same time it is received.⁴³

As indicated in section VI.B and VI.D above, another example arising from equipment programming was the use of the Washington, D.C. location code, which caused some equipment to reject the alert. Other EAS equipment was programmed to ignore a location code when an EAN was received, in which case the alert went through. As a third example, the language in the text crawl that EAS equipment generates from the EAN differs among manufacturers, and many EAS Participants' equipment generated a text crawl that went by too quickly or was in a difficult to read font.

As explained below, the Bureau recommends that the Commission initiate a proceeding to consider these types of equipment performance issues.

VII. A PATH FORWARD TO STRENGTHENING THE EAS

Based on our review of test result information as well as discussions with FEMA, EAS Participants and equipment manufacturers, PSHSB makes several recommendations for the Commission's consideration to address the specific lessons learned identified above. In addition the Bureau recommends several next steps in preparation for future nationwide EAS tests. The Bureau believes that implementation of all of these recommendations will help improve the EAS and ensure that this alerting system serves as a reliable tool to enable the President, as well as state and local governments, to send timely and accurate emergency alerts to the American public.

A. Specific Recommendations To Address Significant Problems Identified By the Nationwide EAS Test

1. Equipment Performance

The Commission should consider commencing a proceeding to examine equipment performance issues during activation of an EAN and to seek comment on proposed changes, if any, to the EAS equipment rules to ensure that all EAS equipment operates in a mutually consistent fashion. As noted above, the test revealed that equipment manufacturers have followed inconsistent interpretations of the Commission's rules in designing and/or programming their products. For example, the manner in which one equipment manufacturer applied the FCC's rules for following EAN code elements resulted in a three minute retransmission delay of the EAN. Further, EAN text crawl language is not consistent among manufacturers, as each ascribes different language to the EAS code for video display purposes. The Bureau believes that all equipment should receive and transmit the EAN (as well as all other EAS alerts) to the public in a consistent manner. These issues are best addressed in the context of a formal proceeding.

⁴² Monroe Electronics, Letter from James F. Heminway, Chief Operating Officer, Monroe Electronics, to Adm. Jamie Barnett, Chief, Public Safety and Homeland Security Bureau, FCC, Dec. 15, 2011 (*Monroe Ex Parte*).

⁴³ *Id.*

2. State EAS Plans

a. Need to Update State EAS Plans

The test revealed some indications that the state EAS plans may be insufficiently clear. For example, several EAS Participants reported difficulties in understanding their monitoring assignments as set forth under their state's EAS plan. Accordingly, the Bureau recommends that the Commission should consider issuing a Public Notice encouraging SECCs to review and update their EAS plans, as necessary, to ensure they contain accurate and up-to-date information regarding monitoring assignments as required by FCC rules.

b. Re-examination of FCC's State EAS Plan Rules

The Bureau recommends that the Commission should also consider reviewing its State EAS Plan rules and seek comment on proposed changes, as necessary. It became clear in the run up to the test and in the Bureau's and FEMA's post-test analysis, that state EAS plans do not require EAS participants to provide data below the LP level, resulting in a failure to provide sufficiently detailed information regarding the propagation of a national (or any other) EAS alert as contemplated by the FCC's rules. Further, as the Commission noted in its *EAS Fifth Report and Order*, some stakeholders have noted that the Commission's rules do not establish adequate guidelines for the structure of state EAS plans,⁴⁴ and fail to define the role for SECCs or the procedures by which SECC members are selected. The need for this became evident during post-test analysis, where the lack of consistency among plans made it very difficult for the Commission and FEMA to create a national propagation map. Finally, as of June 30, 2012, EAS Participants were required to have the capability to receive and process EAS alerts formatted in the Common Alerting Protocol (CAP),⁴⁵ as delivered over FEMA's Integrated Public Alert and Warning System (IPAWS). As a result, SECCs were required to amend state EAS plans to include this new Internet-based monitoring obligation. Although EAS Participants are not required to receive state EAS alerts, CAP-based or otherwise, the time is ripe for the Commission to consider what, if any, changes to its rules regarding state EAS plans are necessary in light of the introduction to CAP-based EAS. In addition, the Commission should also consider whether to make the state EAS plan process into an online, rather than a paper filing, process.

3. Develop and Publicize EAS Participant Best Practices for EAS Operation

Prior to and during the test, both the Bureau and FEMA found that many EAS Participants had many questions about the operation of their EAS equipment and their conduct during the test. To address these questions, the Commission drafted a "day of" Nationwide EAS Handbook for EAS Participants to give them a step by step operational and instructional guide for what to do during the test. FEMA issued an EAS Best Practices Guide and toolkits to educate EAS Participants about EAS operation, particularly during EAN activation. We believe such efforts are quite valuable in educating EAS Participants about the EAS and, accordingly, recommend that the FCC and FEMA work together to determine other areas

⁴⁴ See *Fifth Report and Order*, 27 FCC Rcd at 734, ¶ 27.

⁴⁵ CAP is an open, interoperable XML-based standard that allows an alert initiator to deliver information-rich alerts to multiple devices. See *Fifth Report and Order*, 27 FCC Rcd at 648 ¶ 10. FEMA's IPAWS is a modernization and integration of the nation's alert and warning infrastructure. See FEMA, "Integrated Public Alert and Warning System," available at <http://www.fema.gov/integrated-public-alert-warning-system> (last accessed April 8, 2013). The November 11, 2011 Nationwide EAS Test was solely a test of the broadcast-based "daisy chain" distribution architecture discussed in section III.A., and did not test IPAWS or CAP.

where issuance of joint best practices and other educational materials may be beneficial to EAS Participants and to work together to issue such materials within the next year. Along the same lines, PSHSB recommends that it and FEMA conduct a joint roundtable, webinar or other public workshop designed to provide opportunities to educate EAS Participants about EAS performance and to address concerns and questions EAS Participants may have about EAN operations.

B. Next Steps For the Next Nationwide EAS Test

The Commission's rules and orders contemplate additional nationwide EAS tests. Although the next test has not yet been scheduled, the FCC, FEMA and other EAS stakeholders need to take a number of steps now for that event. Along these lines, the Bureau makes the following recommendations for actions that should be taken in advance of the next test.

1. Need for Additional FCC Rulemakings

The Commission should commence a proceeding to address operational nationwide EAS test issues left open in previous EAS orders. In both the *Third Report and Order* and the *Fifth Report and Order* in the EAS proceeding,⁴⁶ the Commission deferred action on or delegated authority to PSHSB to decide a number of issues (and implement the decisions) concerning the initial nationwide EAS test, such as whether the Commission should adopt a national location code, whether, for future tests, the National Periodic Test (NPT) code should be used in lieu of the live EAN code, and whether EAS Participants should continue to use an EAS Operations Handbook. The Bureau used this authority to make a number of decisions regarding the conduct of the first nationwide EAS test, such as using the Washington, D.C. location code in lieu of a national location code. In light of post-test analysis and discussions with FEMA and EAS stakeholders about these issues, the Bureau believes that many of these issues call for a permanent, rather than ad hoc, resolution, and so should be addressed in a formal notice and comment rulemaking in which all stakeholders may have an opportunity to provide input. Moreover, in some cases, FEMA has recommended that the Commission consider rule changes to address these issues. For example, to bring more consistency to the way EAS equipment processes the EAN, FEMA has recommended that the Commission consider adopting a national location code that could be used for both actual and test activations of the EAN. FEMA has also recommended that the Commission consider changes to its rules regarding the NPT code so that it serves as a viable and less burdensome alternative to use of the EAN.⁴⁷

The Bureau recommends that the Commission commence a rulemaking proceeding to consider and resolve these operational issues. This approach is an efficient way to engage all stakeholders in discussing and crafting solutions to these issues. In conjunction with this proceeding, the Commission should also consider hosting at least one roundtable meeting and/or a public workshop to discuss these issues with EAS stakeholders.

⁴⁶ See, e.g., *Third Report and Order*, 26 FCC Rcd at 1470, 1474, ¶¶ 25, 32; *Fifth Report and Order*, 27 FCC Rcd at 716, ¶ 210.

⁴⁷ Use of the NPT would allow FEMA and the FCC to conduct nationwide EAS testing without the need for an extensive public outreach campaign such as that necessary for the first nationwide EAS test. The rules as currently written, however, do not allow the NPT to perform in the same manner as the EAN and therefore, use of the NPT for the November 9, 2011 test would not have allowed FEMA and the FCC to assess whether the system works as designed.

2. Develop a New EAS Test Database

For the first nationwide EAS test, PSHSB launched a Nationwide EAS Test Reporting System that allowed EAS Participants, if they chose, to file test result data electronically. EAS Participants that filed in this manner were asked to submit three reports at the following intervals: (1) Form 1 - Background Information to be voluntarily submitted prior to November 9, 2011; (2) Form 2 Day of Test Results to be voluntarily submitted only on November 9, 2011; and (3) Final Mandatory Report, requiring the combined information requested in Form 1 and Form 2, as well as an explanation of system performance, to be submitted by December 27, 2011. PSHSB made this system available for electronic filing on its website through January 13, 2012, at which time the database platform underlying the reporting system was decommissioned because the FCC transitioned to a new database platform. For this reason, the Commission should consider creating a new electronic filing system to facilitate electronic filing of test result data for any future nationwide EAS test. As noted above, the date of the next test has not yet been scheduled. Nonetheless, since the FCC's rules and orders contemplate future nationwide testing, it would be consistent with that planning for the Commission to consider starting the development of a new database now.

As a first step, the Bureau should host roundtable discussions with various EAS Participants as well as members of the communications bar to receive feedback on the strengths and weaknesses of the previous system. The Bureau can then use this feedback to develop a system that efficiently allows EAS Participants to file test results and allows the FCC staff to analyze the information it receives.

The Bureau recommends that any new database be made available to EAS Participants at least two months in advance of the next nationwide EAS test. This should give EAS Participants time to become familiar with the new database and for the FCC staff to address any problems well in advance of the test.

3. Reconvene the Federal EAS Test Working Group

PSHSB recommends that the Commission consider requesting the EOP to reconvene the Federal EAS Test Working Group to address issues raised in the first test and to plan the next nationwide EAS test. As noted above, the working group, consisting of FCC, FEMA, NOAA and other federal agencies, regularly coordinated every facet of the first nationwide test. In addition, EOP oversight ensured accountability throughout the process leading up to the test. The Bureau believes this model should be followed for future tests.

As a subset of this recommendation, PSHSB recommends that it and FEMA should continue to meet, both formally and informally, on a regular basis to exchange information and to work together to address problems identified by the test. Meetings among PSHSB and IPAWS staff should occur at least once a month while meetings between the Chief of the PSHSB and the Assistant Administrator for National Continuity Programs should continue at least once every quarter with the option to meet more frequently as needed.

VIII. CONCLUSION

The first-ever Nationwide EAS Test was a success in that it demonstrated that the national EAS would generally perform as designed, if activated. At the same time, the test shined a bright light on several areas – systemic and local – requiring improvement. The Bureau will continue to work with FEMA, EAS Participants and other EAS stakeholders to address these problems and to ensure that the EAS can deliver timely and accurate national alerts to the public, if and when needed.