

Report: October 3, 2018 Nationwide WEA and EAS Test

April 2019



Public Safety and
Homeland Security
Bureau

Federal Communications Commission • 445 12th Street, SW • Washington, DC 20554

TABLE OF CONTENTS

Heading	Page #
I. SUMMARY	3
II. BACKGROUND	4
III. THE 2018 NATIONWIDE WEA TEST	5
A. The Parameters of the Nationwide WEA Test.....	5
B. Key Observations from the Nationwide WEA Test.....	6
IV. THE 2018 NATIONWIDE EAS TEST	8
A. The Parameters of the 2018 Nationwide EAS Test	8
B. Participation in the Nationwide EAS Test	8
C. Participants by EAS Designation	13
D. EAS Participant Monitoring of IPAWS.....	14
E. Breakdown of Test Performance by EAS Participant Type	15
F. Source of Alert.....	16
G. Language of Alert	17
V. ANALYSIS OF MOST SIGNIFICANT ISSUES.....	18
A. The Nationwide WEA Test.....	18
1. Inconsistent Delivery Reports	18
2. Duplicate Messages	19
3. Audio and Vibration Cadence Issues	19
4. Accessibility Issues	20
B. The Nationwide EAS Test	20
1. Equipment Performance Issues	21
2. Equipment Configuration	21
3. Failure to Update Software.....	22
4. Alert Source Issues	22
5. Audio Issues	22
6. Accessibility Issues	23
VI. NEXT STEPS	23
IX. CONCLUSION	24
APPENDIX: HOW WEA AND EAS WORK.....	25

I. SUMMARY

At 2:18 p.m. and 2:20 p.m. Eastern Daylight Time (EDT) on October 3, 2018, the Federal Emergency Management Agency (FEMA), in coordination with the Federal Communications Commission (Commission or FCC) and the National Weather Service (NWS), conducted a nationwide test of both Wireless Emergency Alerts (WEA) and the Emergency Alert System (EAS).¹ The purpose of the test was to assess the reliability and effectiveness of the nation's alert and warning infrastructure, or the Integrated Public Alert and Warning System (IPAWS), as well as the efficacy of WEA and the EAS as nationwide alerting tools. IPAWS is a FEMA-operated alert aggregator that trusted government authorities may use to send WEA alert messages to Participating Commercial Mobile Service (CMS) Providers² and EAS alerts to EAS Participants³ using the common alerting protocol called CAP-formatted.⁴ This protocol enables alerts to be consistently and simultaneously distributed over the EAS and WEA architectures and ultimately transmitted to the public.

The nationwide test demonstrated that WEA is an effective alerting tool to rapidly disseminate emergency information to the public. Based on survey data shared with the Commission, most people reported successful receipt of the WEA test message, with several news reports noting the success of the nationwide test to reach the public.⁵ The test also highlighted areas where WEA delivery can be improved, such as ensuring more consistent delivery, reducing duplicate messages, and resolving issues concerning alert message audio tone and vibration cadence.

With respect to EAS, the nationwide test also demonstrated that IPAWS continues to deliver high-quality, effective, and accessible EAS alerts, and that EAS Participants' results are comparable to 2017 performance levels, with continued improvement in several areas. Specifically:

¹ See *Public Safety and Homeland Security Bureau Announces Nationwide Test of the Wireless Emergency Alert and Emergency Alert Systems on September 20, 2018*, Public Notice, 33 FCC Rcd 6825 (PSHSB 2018). The test was pushed back from its originally scheduled date to the back-up test date due to ongoing response efforts to Hurricane Florence. *Public Safety and Homeland Security Bureau Notes Rescheduling of Nationwide Test of Wireless Emergency Alerts and the Emergency Alert System for October 3, 2018*, Public Notice, 33 FCC Rcd 8757 (PSHSB 2018).

² Participating CMS Providers are commercial mobile service providers that have elected voluntarily to transmit WEA messages. See 47 CFR § 10.10(d), (f).

³ The Commission's rules define EAS Participants as broadcast stations; cable systems; wireline video systems; wireless cable systems; direct broadcast satellite service providers; and digital audio radio service providers. See 47 CFR § 11.11(a). Internet Protocol Television (IPTV) providers and cable resellers are not defined in Part 11 of the rules and are considered voluntary participants in the test in the EAS Test Reporting System (ETRS), the online system used by the Commission to collect and analyze the results of nationwide EAS tests. See 47 CFR § 11.61(a)(3)(iv).

⁴ CAP is an open, interoperable, XML-based standard that can include multimedia such as streaming audio or video. See OASIS CAP v1.2 (IPAWS Profile for the OASIS Common Alerting Protocol IPAWS USA). CAP messages contain standardized fields that facilitate interoperability between and among devices. See 47 CFR § 10.10(a); Appendix at 30-31, *infra*.

⁵ See, e.g., Letter from Benjamin J. Krakauer, Assistant Commissioner, Strategy & Program Development, New York City Emergency Management Department, to Marlene Dortch, Secretary, Federal Communications Commission, PS Docket Nos. 15-91 and 15-94 (filed Nov. 21, 2018) (NYCEM *Ex Parte*); Thomas Crane, *The Presidential Alert: Was it a success?*, EVERBRIDGE (Oct. 15, 2018), <https://www.everbridge.com/blog/the-presidential-alert-was-it-a-success/> (Everbridge Blog Post); Emily Dreyfuss, *Why Didn't I Get an Emergency Presidential Alert Text?*, WIRED (Oct. 3, 2018), <https://www.wired.com/story/why-didnt-i-get-emergency-presidential-alert-text/> (*Wired* article).

- A majority (58.7%) received the test alert first via IPAWS, as compared to 41.9% in 2017;
- A similar rate of both successfully receiving and retransmitting the test alert (95.7% receipt, as compared to 95.8% in 2017; 92.1% retransmission, as compared to 91.9% in 2017);
- An increase in receiving and retransmitting the test alert in both English and Spanish (rates up from 2017 by 388% for receiving the alert and by 350% for retransmitting the alert);
- A decline in audio issues reported as an explanation for complications in receipt and retransmission (down to 68 explanations, from 1056 explanations provided in 2017); and
- Slightly higher rates of configuring their equipment to monitor IPAWS (96.8%, as compared to 96.7% in 2017).

This report provides an analysis of the 2018 nationwide test results of WEA and EAS. This report offers insight on WEA and EAS performance, and it provides useful information on areas for improvement regarding technical and operational performance. The report also includes recommended next steps that the Public Safety and Homeland Security Bureau (PSHSB or the Bureau), EAS Participants, and Participating CMS Providers can take to improve WEA and EAS as a reliable alerting tool to protect all Americans.

II. BACKGROUND

WEA and EAS are invaluable communications alerting tools. They provide the President a means to address the American public during times of national emergency. They also provide authorized state and local alert originators⁶ an effective means to transmit local and or statewide emergency information, such as severe weather alerts and America’s Missing: Broadcast Emergency Response (AMBER) Alerts.⁷ The Commission, in conjunction with FEMA and the NWS, implement WEA and EAS at the federal level.

WEA. WEA enables authorized alert originators to deliver geographically targeted critical warnings and information to the public on their WEA-capable mobile devices. This process begins when the alert originator sends a WEA Alert Message,⁸ using FEMA-approved alert origination software in the CAP, to IPAWS. Through IPAWS, the Alert Message is authenticated, validated, and delivered to FEMA’s Alert Gateway for dissemination to Participating CMS Providers’ Alert Gateways, where it is then transmitted to the mobile subscribers’ WEA-capable devices. CMS Provider participation in WEA is voluntary, and a CMS Provider may elect to participate in WEA “in whole” or “in part” by filing an election letter with the Commission.⁹ All Participating CMS Providers are required to participate in the nationwide WEA

⁶ The term “alert originator” refers to a federal, state, territorial, tribal, or local entity authorized by FEMA to use IPAWS to issue critical public alerts and warnings in emergency situations. *See* FEMA, *Alerting Authorities*, <https://www.fema.gov/alerting-authorities> (last updated Oct. 11, 2018, 12:47 p.m.).

⁷ The AMBER (America’s Missing: Broadcast Emergency Response) program is a nationwide alerting program designed to help bring missing children to safety. *See* Office of Justice Programs, *AMBERAlert.gov*, <http://www.amberalert.gov/about.htm> (last visited Mar. 11, 2019).

⁸ *See* 47 CFR § 10.10(a) (defining an “Alert Message” as “a message that is intended to provide the recipient information regarding an emergency, and that meets the requirements for transmission by a Participating Commercial Mobile Service Provider under this part”).

⁹ *Id.* at §§ 10.10(f), (k), (l); 10.210. CMS Providers are considered to participate in WEA “in whole” when they agree to transmit WEA Alert Messages in a manner consistent with the technical standards, protocols, procedures, and other technical requirements implemented by the Commission in the entirety of their geographic service area, and when all mobile devices that they offer at the point of sale are WEA-capable. *Id.* at § 10.10(k). CMS Providers participate in WEA “in part” when they agree to transmit WEA Alert Messages in a manner consistent with the technical standards, protocols, procedures, and other technical requirements implemented by the Commission in some, but not in all, of their geographic service areas, or not all mobile devices that they offer at the point of sale are WEA-capable. *Id.* at § 10.10(l).

test, to the fullest extent of their elected participation status.¹⁰ As of March 4, 2019, WEA has been used to issue nearly 44,000 emergency alerts, including severe weather warnings, evacuate and shelter-in-place alerts, and AMBER Alerts¹¹ since it was deployed in April 2012.¹² More information about WEA can be found in the Appendix.

EAS. The EAS provides the President with the capability to communicate with the public during a national emergency via live audio transmission. FCC rules require EAS Participants to have the capability to receive and transmit Presidential Alerts disseminated over the EAS.¹³ There are two methods by which EAS alerts may be distributed. Under the traditional, broadcast-based “legacy” structure, the EAS transmits an alert through a pre-established hierarchy of broadcast, cable, and satellite systems using the EAS Protocol, a simple digital messaging protocol that delivers basic alert elements over the air.¹⁴ EAS alerts that are formatted in the more sophisticated CAP are distributed over the Internet through IPAWS. CAP-formatted alerts initiated through IPAWS can include audio, video or data files, images, non-English translations of alerts, and links providing detailed information.¹⁵ The Appendix contains additional information about the EAS.

III. THE 2018 NATIONWIDE WEA TEST

A. The Parameters of the Nationwide WEA Test

This test marks the first nationwide end-to-end test of the WEA system.¹⁶ The test message stated: “THIS IS A TEST of the National Wireless Emergency Alert System. No action is needed.” The test message was delivered through IPAWS to Participating CMS Providers’ Alert Gateways, where it was then transmitted to their subscribers’ WEA-capable devices across the nation.¹⁷

¹⁰ *Id.* at §§ 10.10(d), (f), (k), (l); 10.210.

¹¹ Data based on PSHSB staff conversation with FEMA on March 11, 2019.

¹² *See Public Safety and Homeland Security Bureau Sets Timetable in Motion for Commercial Mobile Service Providers to Develop a System That Will Deliver Alerts to Mobile Devices*, PS Docket No. 07-287, Public Notice, 24 FCC Rcd 14388 (PSHSB 2009).

¹³ *See* 47 CFR §§ 11.2(a), 11.11, 11.54.

¹⁴ *See* Appendix, *infra*, at 29. *See also* 47 CFR § 11.31.

¹⁵ EAS Participants can deliver to the public the rich data contained in a CAP-formatted message received directly from the IPAWS Internet feed, but once the alert is rebroadcast over the daisy chain, the CAP data are lost, and EAS Participants receiving the alert for the first time over the air cannot deliver CAP-based features, such as digital audio or multiple languages, to the public.

¹⁶ An “end-to-end” test signifies that the test, similar to a live alert message, was initiated by Alert Originators and received on an end user’s mobile device. The nationwide WEA test was administered pursuant to a limited waiver of the Commission’s WEA rules. *See Improving Wireless Emergency Alerts and Community-Initiated Alerting; Amendments to Part 11 of the Commission’s Rules Regarding the Emergency Alert System*, Order, 33 FCC Rcd 6816 (PSHSB 2018). The Commission’s rules prohibit the use of the WEA Attention Signal except during actual emergencies, authorized tests, and certain public service announcements. 47 CFR § 10.520(d). Additionally, the Commission’s rules allow testing of WEA functionality only in limited circumstances that currently do not include end-to-end WEA tests to the public. *Id.* at § 10.350. Entities seeking to conduct an end-to-end test must therefore request a limited waiver of the WEA rules on behalf of Participating CMS Providers.

¹⁷ Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands did not receive the WEA portion of the test because they do not have cellular providers that participate in WEA. Press Release, Guam Homeland Security/Office of Civil Defense, Nationwide Emergency Alert System Test Planned (Aug. 3, 2018, 9:45 a.m.), <https://www.ghs.guam.gov/nationwide-emergency-alert-system-test-planned>.

B. Key Observations from the Nationwide WEA Test

In order to evaluate the efficacy of the WEA test message during the nationwide test, PSHSB reviewed data from a variety of sources, and members of the public were encouraged to share feedback regarding the receipt of the test message. Based on this information, we summarize our key observations from the 2018 nationwide WEA test.

Several local emergency management agencies and other entities conducted informal surveys via email, social media, and the Internet to determine whether respondents received the WEA test message. Although individual surveys vary based on sample size, location, and response rates, most people reported successfully receiving the WEA test message.¹⁸

Relevant survey data are described below:

- The New York City Emergency Management Department (NYCEM) administered its survey via Notify NYC, social media, and partner engagement.¹⁹ NYCEM reported that of 2,351 respondents, 81.4% reported receiving the WEA test message.²⁰ Of those that reported receiving the message,²¹ 83% of respondents reported that they received the message within ten minutes.²² 17.3% reported that they did not receive a WEA message, citing a number of explanations such as spotty wireless service, being on the subway, or turning the phone off or set to airplane mode or “Do Not Disturb”; however, the vast majority (77%) cited no known reason for not receiving the message.²³ For those respondents who did not receive a WEA message for no known reason, 29% listed AT&T as their wireless provider, 24% listed T-Mobile, 22% listed Verizon, 7% listed Sprint, 10% listed “Other,”²⁴ and 8% provided no response.²⁵
- The alert software vendor Everbridge conducted a detailed survey following the nationwide WEA test and received responses from over 3,500 people across all 50 states.²⁶ 83% of respondents said they received the WEA alert on their smartphone, while 15% reported that they did not receive an alert through either WEA or EAS.²⁷ Of all survey respondents, 48% reported that their wireless provider is Verizon, followed by AT&T (25%), T-Mobile (11%), and Sprint (8%).²⁸

¹⁸ See, e.g., NYCEM *Ex Parte*; Everbridge Blog Post; Kortnie Horazdovsky, 'Presidential Alert' results in Alaska split almost 50-50, survey says, KTUU (Oct. 10, 2018), <https://www.ktuu.com/content/news/Presidential-Alert-results-in-Alaska-split-almost-50-50-survey-says-496752991.html> (KTUU Alaska News Report).

¹⁹ NYCEM *Ex Parte* Attachment at 3.

²⁰ *Id.* at 3, 5. NYCEM received responses from across the nation, with only 1,705 of the 2,351 responses received coming from New York City. *Id.* at 3.

²¹ NYCEM reports that 17.3% of respondents did not receive the WEA test message, while 1.3% were unsure if they received the message and/or skipped the question. *Id.* at 5.

²² *Id.*

²³ *Id.* at 6.

²⁴ “Other” mobile service provider includes: Project Fi, TracFone, Boost Mobile, MetroPCS, Virgin Mobile, CREDO Mobile, Cricket, Freedom Pop, Net10, Simple Mobile, Tell, and Ting. *Id.* at 7.

²⁵ *Id.*

²⁶ Everbridge Blog Post.

²⁷ *Id.*

²⁸ *Id.*

Respondents reporting Sprint as their provider also reported the highest percentage of all wireless providers in receiving the alert, at 88%.²⁹

- The Alaska Division of Homeland Security and Emergency Management conducted an unscientific poll which received over 5,000 responses. Of those respondents, 52.7% reported that they received the alert. Respondents' locations show higher concentrations in Alaska's urban areas, whereas fewer respondents are scattered across Alaska's interior.³⁰
- The National Association of the Deaf (NAD) conducted a survey among the deaf and hard of hearing community on October 9, 2018, following the nationwide WEA test, and received 199 responses.³¹ The survey results indicate that 70.4% of respondents received the WEA test message.³² Of the respondents that indicated they did not receive the WEA alert, 42% reported AT&T as their wireless provider, 19% reported Verizon, 17% reported Sprint, 12% reported T-Mobile, and the remaining 10% reported "Other".³³ According to NAD, those "140 respondents who reported receiving the WEA alert did not report any accessibility issues."³⁴

PSHSB received feedback from the public through the Public Safety Support Center, which, through the week following the test, received a total of 316 responses.³⁵ Of those responses, approximately 61% reported no problems in receiving the WEA test message. The remaining 39% either did not receive a WEA or received one that had issues including receipt of multiple messages or problems with the tone or vibration cadence. The Consumer and Governmental Affairs Bureau (CGB) also received 36 complaints about the nationwide WEA test.³⁶ Consumers either submitted a complaint online or called CGB's call center and an agent submitted a complaint on behalf of a consumer.³⁷ Fourteen complaints offered relevant information regarding the success of the test, two complaints involved EAS issues not related to the national test, and the remainder offered non-substantive political comments. Of those relevant filings, 10 reported some WEA issues, the vast majority noting they did not receive the alert. PSHSB also received additional feedback through incidental emails and reports from FCC staff monitoring the test. Through the week following the test, PSHSB staff received 55 reports from those who received the alert across all phone types and major providers and 33 reports that the alert was not received.³⁸

²⁹ *Id.*

³⁰ KTUU Alaska News Report.

³¹ Memorandum to Federal Communications Commission, Public Safety [and] Homeland Security Bureau, from Zainab Alkebsi, NAD Policy Counsel, National Association of the Deaf, "Experiences of deaf and hard of hearing consumers with respect to the Presidential Alert on October 3, 2018," (Jan. 25, 2019), *available with PSHSB Staff* (NAD Memo). The survey included an American Sign Language (ASL) video explaining the purpose of the survey and a link to the written questions, which can be found at <https://www.nad.org/national-alert-survey/>.

³² NAD Memo at 1.

³³ *Id.* at 1-2.

³⁴ *Id.* at 2.

³⁵ Responses received as of 12:00 p.m. on October 10, 2018.

³⁶ Complaints received as of 1:30 p.m. on October 4, 2018.

³⁷ The CGB call center received about 65 calls on the day of the test and ten calls between 8:00 a.m. and 1:30 p.m. on the day following the test. There was a higher call volume immediately following the test, which resulted in a higher abandonment rate; therefore, it is possible the call center received additional calls not reflected in this total.

³⁸ Feedback received as of 4:00 p.m. on October 10, 2018.

IV. THE 2018 NATIONWIDE EAS TEST

A. The Parameters of the 2018 Nationwide EAS Test

FEMA initiated the nationwide EAS test by providing a “National Periodic Test” code (NPT) on its Internet-based feed for IPAWS.³⁹ Each EAS Participant then received the alert either directly from IPAWS by polling the IPAWS Internet feed, or via a re-broadcast of the alert by the source that it monitors in the “daisy chain.”⁴⁰ As in 2017, EAS Participants that first obtained the test alert via IPAWS received a CAP-formatted alert with a high quality, pre-recorded digital audio message, a detailed text file that could populate a video crawl, as well as English and Spanish versions of the test alert that EAS Participants could transmit to the public in accordance with their equipment’s configuration. EAS Participants that first obtained the alert over the air from a monitored broadcast station received the alert in the basic EAS Protocol, which lacked the capability of delivering separate audio and non-English text files and was dependent on radio reception for the quality of the audio.⁴¹

B. Participation in the Nationwide EAS Test

There are approximately 25,827 EAS Participants in the United States and its territories.⁴² This estimate includes analog and digital radio broadcast stations (including AM, FM, and Low Power FM (LPFM) stations); analog and digital television broadcast stations (including Low Power TV (LPTV)); analog and digital cable systems; wireless cable systems; wireline video systems;⁴³ Direct Broadcast Satellite (DBS) services; and Satellite Digital Audio Radio Service (SDARS).⁴⁴

Table 1 summarizes the participation rate in the 2018 nationwide EAS test.⁴⁵ Excluding duplicate filings,⁴⁶ EAS Participants made 19,704 unique filings⁴⁷ with a participation rate of 76.3%.⁴⁸ This result is a slight reduction from the 19,738 unique filings received for the 2017 nationwide EAS test; nonetheless, the 2018 participation rate is a slight increase from 2017’s rate of 76.2% due in part to the

³⁹ See FCC, PSHSB, Report: September 28, 2016 Nationwide EAS Test at 3 (2016), https://apps.fcc.gov/edocs_public/attachmatch/DOC-344518A1.pdf (2016 Nationwide EAS Test Report); FCC, PSHSB, Report: September 27, 2017 Nationwide EAS Test at 3 (2017), <https://www.fcc.gov/document/report-2017-nationwide-emergency-alert-system-test> (2017 Nationwide EAS Test Report). For the 2011 Nationwide EAS Test, FEMA did not use the test code but rather initiated the test by transmitting a live Emergency Action Notification (EAN), the EAS event code that the President would use in the event of a national emergency. FEMA initiated the 2011 Nationwide EAS Test by transmitting a live EAN event code over a secure telephone connection to the Primary Entry Point (PEP) stations. The PEPs then transmitted the EAN to the public over the broadcast-based “daisy chain.” See FCC, PSHSB, Strengthening the Emergency Alert System (EAS): Lessons Learned from the Nationwide EAS Test at 5 (2013), <http://www.fcc.gov/document/strengthening-emergency-alert-system> (2011 EAS Nationwide Test Report).

⁴⁰ Participants’ EAS equipment polls the IPAWS server to check for new alerts at regular intervals. If an EAS Participant receives an over-the-air alert before it checks IPAWS, the over-the-air alert is retransmitted.

⁴¹ The EAS Protocol uses a four-part message for an emergency activation of the EAS. The four parts are: Preamble and EAS Header Codes; audio Attention Signal; message; and Preamble and EAS End Of Message (EOM) Codes. See 47 CFR § 11.31. These parts can inform the public as to the nature, location, effective times, and originator of the alert, but are not capable of including separate files for digital audio, text or for languages other than English.

⁴² This total consists of the 17,680 radio broadcasters and 4,056 television broadcasters in the FCC’s Consolidated Database System, the 4,087 headends active in the FCC’s Cable Operations and Licensing System, and the number of Direct Broadcast Satellite (DBS) and Satellite Digital Audio Radio Service (SDARS) facilities. This methodology likely overestimates number of radio and television broadcasters that participate in the EAS, as some are exempted from the Commission rules that govern EAS. For example, if a hub station satisfies the EAS (continued...)

fact that there were fewer EAS Participants in 2018 than in 2017.⁴⁹ The reduction in filings may have resulted from several factors, including severe weather and wildfires during summer and fall of 2018. It is also possible that broadcasters participated but did not file in ETRS. Radio broadcasters had an above-average participation rate of 78.7%, while television broadcasters had the lowest participation rate of 65.5%, which is a three-point decline from the 2017 rate of 68.5%. Cable system, IPTV, and wireline video system participants had an improved participation rate of 76.4%, which was slightly higher than the 2017 rate of 74%.

(Continued from previous page) _____
requirements, an analog or digital broadcast satellite station that rebroadcasts 100% of the hub station's programming would not be required to file in ETRS. *See id.* at § 11.11(b).

⁴³ Wireline video systems are the systems of a wireline common carrier used to provide video programming service. *Id.* at § 11.2(e).

⁴⁴ *Id.* at § 11.11(a).

⁴⁵ A small number of EAS Participants provided their EAS Participant type incorrectly. Those errors have been corrected for purposes of this report.

⁴⁶ EAS Participants submitted 22,810 filings in 2018. More than 3,000 of these filings duplicated facilities for which EAS Participants had already filed. The total number of filings include the cumulative tabulation for all forms received from a filer. For example, if a filer submitted Forms One, Two and Three through ETRS, this would be recorded as one filing, rather than three separate filings.

⁴⁷ Unique filings are non-duplicate filings, defined as a set of filings that represent the report of a single EAS Participant facility, such as a radio station or a cable headend. Most duplicate filings were submitted for cable systems. To the extent that EAS Participants' filings indicate that a headend serves alerts using multiple, independent sets of EAS equipment, each set of equipment is considered as a unique headend in this report. The numbers cited in this report are slightly higher than those reported in the December 2018 Initial Public Notice to account for additional analysis. *See Public Safety and Homeland Security Bureau Releases Its Initial Findings Regarding the 2018 Nationwide EAS Test*, Public Notice, 32 FCC Rcd 10272 (PSHSB 2018).

⁴⁸ For purposes of this report, participation rate is defined as the number of unique filings received from a specified EAS Participant type divided by the total number of EAS Participants of that type.

⁴⁹ *2017 Nationwide EAS Test Report* at 6.

Table 1. Overview of Filings Received in ETRS⁵⁰

EAS Participant Type	# of EAS Participants	Filings Received	Unique Filings Received	Filing Rate
Radio Broadcasters	17680	14562	13908	78.7%
Television Broadcasters	4056	2908	2658	65.5%
Cable Systems	4083	4988	2812	76.4%
IPTV Providers		246	246	
Wireline Video Systems		89	63	
Other ⁵¹	n/a	17	17	n/a
All Total	25819	22810	19704	76.3%

Table 2 provides an overview of the completeness of the filings submitted to ETRS. Form One asked EAS Participants to report basic identifying information, such as ownership or licensee contact information, EAS designation as identified in their State EAS Plan, and the make, model, and software version of their EAS equipment. Form Two asked EAS Participants to report “day of test” results, including whether they had successfully received and retransmitted the test alert. Form Three asked EAS Participants to report more detailed test results, such as the first source from which the alert was received, the language in which the alert was received, and details of any issues experienced during the test. 88.9% of filers completed Forms One, Two, and Three, as required by the Commission’s rules.⁵² 8.5% of filers submitted “day of test” results, but failed to submit the detailed test results required by Form Three. 2.5% of filers failed to submit any test results, filing only their identifying information required by Form One. IPTV provider filers had a high form completion rate of 96.3%, while radio broadcasters had a lower form completion rate of 87.2%.

⁵⁰ The Commission has determined that test result data submitted by EAS Participants be treated as presumptively confidential. *See Review of the Emergency Alert System*, EB Docket No. 04-296, Sixth Report and Order, 30 FCC Rcd 6520, 6533, para. 27, note 90 (2015) (noting that test data received from EAS Participants or any reports that contain individual test data shall be treated as presumptively confidential). Accordingly, Table 1 and others in this report reflect aggregated test result data to the extent doing so does not result in disclosure of confidential information. As referenced throughout this report, PSHSB does not provide data for very small groups of EAS Participants and does not include them among the total number of filings. The omission of this data does not change the assessment of the test in any significant way.

⁵¹ “Other” includes “non-cable multichannel video programming distributors” and other entities reported in the ETRS but not defined as EAS Participants in the EAS rules.

⁵² 47 CFR § 11.61(a)(3)(iv).

Table 2. Overview of Filings Received in ETRS by Form Type

EAS Participant Type	Unique Filings	Form One Filed Only		Forms One and Two filed Only		Forms One, Two, and Three Filed	
		Unique Filings	%	Unique Filings	%	Unique Filings	%
Radio Broadcasters	13908	443	3.2%	1339	9.6%	12126	87.2%
Television Broadcasters	2658	36	1.4%	204	7.7%	2418	91.0%
Cable Systems	2812	20	0.7%	127	4.5%	2665	94.8%
IPTV Providers	246	3	1.2%	6	2.4%	237	96.3%
Wireline Video Systems	63	0	0.0%	7	11.1%	56	88.9%
Other	17	1	5.9%	1	5.9%	15	88.2%
All Total	19704	503	2.5%	1684	8.5%	17516	88.9%

Table 3 compares the filing rate of Low Power broadcasters to that of all broadcasters.⁵³ LPFM participation in the test (48.4%) was lower than that of radio broadcasters overall (78.5%), and LPTV participation (41.5%) was lower than that of television broadcasters overall (65.1%). Further, the low participation rate of Low Power broadcasters appears to have reduced the overall participation rate of all broadcasters. Of the 3,802 radio broadcasters that were expected to file but failed to do so, 1,121 were LPFM Broadcasters. Of the 1,414 television broadcasters that were expected to file but failed to do so, 1,116 were LPTV broadcasters, up from 712 in 2017.⁵⁴

⁵³ Tables 3 through 12 exclude EAS Participants that report to be silent pursuant to a special temporary authorization granted by the Commission. See also, Table 7, *infra*, at 16 (describing the test results of Low Power participants).

⁵⁴ 2017 Nationwide EAS Test Report at 7.

Federal Communications Commission

Table 3. Overview of Filings Received From Broadcasters

	Filers Expected	Filings Rec'd ⁵⁵	Filing Rate	Form One Filed		Forms One and Two Filed		Forms One, Two, and Three Filed	
				#	%	#	%	#	%
All Radio Broadcasters	17680	13878	78.5%	443	3.2%	1339	9.6%	12096	87.2%
LPFM Broadcasters	2172	1051	48.4%	89	8.5%	127	12.1%	835	79.4%
All Television Broadcasters	4056	2642	65.1%	36	1.4%	204	7.7%	2402	91.0%
LPTV Broadcasters	1908	792	41.5%	10	1.3%	34	4.3%	748	94.4%

⁵⁵ Unique Filings Received. See note 47, *supra*.

C. Participants by EAS Designation

ETRS Form One asked EAS Participants to identify the EAS designations assigned to them by their State EAS Plan. **Table 4** provides the reported EAS designations of all test participants by participant type.⁵⁶ Although a number of test participants continue to incorrectly report their participant type, this number decreased from that reported after the 2017 nationwide EAS test. For example, 539 test participants reported that they served as National Primary (Primary Entry Point or PEP) stations,⁵⁷ which are the source of EAS Presidential messages, which is down from the 543 test participants that reported as such in 2017⁵⁸ and 567 reported in 2016.⁵⁹ However, according to FEMA, there are only 77 Primary Entry Point stations nationwide. 230 test participants reported that they served as state primary stations, while 237 test participants reported as such at the time of the 2017 nationwide EAS test.⁶⁰ This data suggests that test participants better understand their role in the EAS than they did in 2017, but there is still room for improvement.

Table 4. EAS Designation by Participant Type⁶¹

EAS Participant Type	National Primary (NP)	State Primary (SP)	State Relay (SR)	Local Primary 1 (LP1)	Local Primary 2 (LP2)	Participating National (PN)
Radio Broadcasters	305	147	854	1040	723	11295
Television Broadcasters	47	25	133	87	78	2370
Cable Systems	167	57	47	189	108	2492
IPTV Providers	12	1	2	26	13	212
Wireline Video Systems	8	0	3	18	6	40
Other	0	0	3	3	1	9
All Total	539	230	1042	1363	929	16418

⁵⁶ For this report, a “test participant” is a unique EAS Participant that completed, at a minimum, ETRS Forms One and Two. Unless otherwise specified, the analyses hereafter only consider filings made by test participants.

⁵⁷ 47 CFR § 11.18(a).

⁵⁸ See 2017 Nationwide EAS Test Report at 8.

⁵⁹ See 2016 Nationwide EAS Test Report at 9.

⁶⁰ See 2017 Nationwide EAS Test Report at 8. In 2011, PSHSB estimated that there were 94 state primary stations. 2011 EAS Nationwide Test Report at 8.

⁶¹ Data reflects EAS designations as self-reported in Form One.

D. EAS Participant Monitoring of IPAWS

All EAS Participants are required to monitor IPAWS.⁶² ETRS Form One asked EAS Participants to confirm whether their facility’s equipment complied with this requirement. **Table 5** shows that 96.8% of test participants reported that they are complying with the IPAWS monitoring requirement—a slight increase from 96.7% in 2017.⁶³ Wireline video systems continued to increase their IPAWS monitoring rate from 68.5% in 2016 to 91.7% in 2017 to 95.2% in 2018.

Table 5. IPAWS Monitoring by Participant Type

EAS Participant Type	Test Participants	Monitoring IPAWS	
		#	%
Radio Broadcasters	13878	13494	97.2%
Television Broadcasters	2642	2574	97.4%
Cable Systems	2812	2659	94.6%
IPTV Providers	246	235	95.5%
Wireline Video System	63	60	95.2%
Other	17	15	88.2%
<i>All Total</i>	19658	19037	96.8%

⁶² 47 CFR § 11.52(d)(2).

⁶³ 2017 *Nationwide EAS Test Report* at 9. Possible explanations for test participants reporting that they do not monitor IPAWS include a lack of broadband access, lack of familiarity with EAS equipment functions, and noncompliance with the Commission’s rules.

E. Breakdown of Test Performance by EAS Participant Type

ETRS Form Two asked EAS Participants whether they had successfully received and retransmitted the test alert on October 3, 2018. **Table 6** shows test participants’ success rates for alert receipt and retransmission. This data indicates that 95.7% of test participants successfully received the alert. This is almost the same as the 95.8% success rate that was observed in 2017. In addition, the number of test participants and the number reporting successful receipt of the alert both increased this year.⁶⁴ Test participants experienced additional complications with retransmitting the alert to the public and other EAS Participants, but still achieved a success rate of 92.1%. SDARS, DBS, wireline video systems, and other communications providers⁶⁵ had the highest receipt success rates. 96.4% of radio broadcasters successfully received the alert, and 93.7% successfully retransmitted it. For the first time, 100% of wireline video systems successfully received the alert, though only 90.5% were able to retransmit it, which is a slight decline from 93.8% in 2017.⁶⁶ Additionally, though slightly more successful than 2017, television broadcasters continue to report below average success rates, with 89.5% successfully receiving the alert and 84.5% successfully retransmitting; this shows a slight increase as compared to 2017 where 88.6% successfully received the alert and 83.5% were able to retransmit.⁶⁷

Table 6. Test Performance by Participant Type

EAS Participant Type	Test Participants	Successfully Received Alert		Successfully Retransmitted Alert	
		#	%	#	%
Radio Broadcasters	13435	12954	96.4%	12591	93.7%
Television Broadcasters	2606	2334	89.5%	2202	84.5%
Cable Systems	2792	2731	97.8%	2545	91.2%
IPTV Providers	243	237	97.5%	223	91.8%
Wireline Video Systems	63	63	100%	57	90.5%
Other	16	16	100%	15	93.8%
All Total	19155	18335	95.7%	17633	92.1%

⁶⁴ 2017 Nationwide EAS Test Report at 10.

⁶⁵ “Other” includes “non-cable multichannel video programming distributors” and other entities reported in the ETRS but not defined as EAS Participants in the EAS rules. See note 51, *supra*.

⁶⁶ 2017 Nationwide EAS Test Report at 10.

⁶⁷ *Id.*

Table 7 shows the performance of Low Power broadcasters in the 2018 nationwide EAS test. LPFM broadcasters had an alert receipt success rate of 90.3%, approximately 6% less than the rate of all radio broadcasters, and an alert retransmission success rate of 82%, approximately 12% less than the rate of all radio broadcasters. These results are similar, though slightly lower, as compared to 2017 nationwide EAS test results, in which LPFM broadcasters had an alert receipt success rate of 92.5% and a retransmission alert success rate of 83.8%.⁶⁸ LPTV broadcasters had lower success rates than television broadcasters generally. 71.5% of LPTV broadcasters successfully received the alert, 18% less than the rate of all television broadcasters. This is a slight decrease compared to 2017, when 76.6% of LPTV broadcasters reported successfully receiving the alert.⁶⁹ 67.3% of LPTV broadcasters successfully retransmitted the alert, approximately 17% less than the rate of all television broadcasters. This is a decline from 2017, when 72.3% reported successfully retransmitting the alert.⁷⁰

Table 7. Test Results of Broadcasters

EAS Participant Type	Test Participants	Successfully Received Alert		Successfully Retransmitted Alert	
		#	%	#	%
All Radio Broadcasters	13435	12954	96.4%	12591	93.7%
LPFM Broadcasters	962	869	90.3%	789	82.0%
All Television Broadcasters	2606	2334	89.5%	2202	84.5%
LPTV Broadcasters	782	559	71.5%	526	67.3%

F. Source of Alert

On ETRS Form Three, EAS Participants identified the first source from which they received the test alert. **Table 8** compares the sources from which the different types of test participants received the test alert. A majority (58.7%) of test participants reported to have first received the alert from IPAWS and a minority (41.3%) first received the alert over-the-air. This represents the first time during a nationwide EAS test that the majority of EAS Participants first received the alert through IPAWS.⁷¹ IPTV providers reportedly first received the alert via IPAWS more frequently than other participant types (73.6%).

⁶⁸ *Id.* at 10-11.

⁶⁹ *Id.*

⁷⁰ *Id.*

⁷¹ See *2016 Nationwide EAS Test Report* at 11-12 (56.5% of test participants reporting as first receiving the alert over-the-air); *2017 Nationwide EAS Test Report* at 11 (58.1% of test participants reporting as first receiving the alert over-the-air).

Table 8. Source of Alert by Participant Type

EAS Participant Type	Test Participants That Reported Source of Alert	First Received From IPAWS		First Received Over-the-Air	
		#	%	#	%
Radio Broadcasters	11688	6657	57.0%	5031	43.0%
Television Broadcasters	2139	1306	61.1%	833	38.9%
Cable Systems	2609	1659	63.6%	950	36.4%
IPTV Providers	231	170	73.6%	61	26.4%
Wireline Video Systems	56	28	50.0%	28	50.0%
Other	15	10	66.7%	5	33.3%
All Total	16738	9830	58.7%	6908	41.3%

G. Language of Alert

Form Three asked EAS Participants to report the languages in which they received and retransmitted the test alert. **Table 9** shows the language of the alerts that were received and retransmitted by test participants. This year shows a triple-digit increase in the number of alerts received and retransmitted in Spanish-only and in English and Spanish, with alerts in English and Spanish received increasing 388% and alerts in English and Spanish retransmitted increasing 350% from 2017.⁷²

Table 9. Spanish Versus English Language Alerts by Participant Type

EAS Participant Type	Received Alert			Retransmitted Alert		
	English	Spanish	English and Spanish	English	Spanish	English and Spanish
Radio Broadcasters	11548	65	54	11230	103	18
Television Broadcasters	2085	10	41	1958	20	45
Cable Systems	2033	0	572	1868	0	555
IPTV Providers	224	0	7	210	0	7
Wireline Video Systems	48	0	8	42	0	8
Other	15	0	0	14	0	0
All Total	15953	75	682	15322	123	633

⁷² 2017 Nationwide EAS Test Report at 12.

This year, filers reported the primary languages in their service area. **Table 10** tallies the five highest reported service area languages. Of the 12,929 responses received from EAS Participants, 11,891 reported English, 799 reported both English and Spanish, and 206 reported Spanish only. Russian, Chinese, Korean, Samoan, Portuguese, Punjabi, Haitian, French, Armenian, Navajo, Vietnamese, Hindi, Testl, and Inupiaq/Yup'ik Eskimo were also reported in smaller numbers.

Table 10. Primary Language(s) in Service Area

English		English and Spanish		Spanish		Russian		Chinese	
#	%	#	%	#	%	#	%	#	%
11891	92%	799	6.2%	206	1.6%	2	0.0%	2	0.0%

V. ANALYSIS OF MOST SIGNIFICANT ISSUES

A. The Nationwide WEA Test

PSHSB has assessed data and informal feedback from a variety of sources to identify complications or issues that the public may have encountered during the WEA portion of the nationwide test. Overall, the most significant issues identified include inconsistent delivery, duplicate alert messages, audio and vibration cadence issues, and accessibility issues.

1. Inconsistent Delivery Reports

News reports indicate that in certain portions of the country, Participating CMS Providers did not successfully deliver the WEA test message as a result of service outages.⁷³ Specifically, some news reports indicated that shortly after the nationwide WEA test, AT&T Wireless and T-Mobile experienced a widespread outage in parts of Washington, Alaska, California, and Oregon.⁷⁴ Other news reports indicated that WEA receipt was uneven, with some individuals receiving the alert while others in the same region did not.⁷⁵ Some reports identify trends, such as delivery problems occurring in newer devices that had not undergone testing prior to the nationwide test to troubleshoot potential issues,⁷⁶ or

⁷³ See, e.g., Q13 News Staff, *AT&T reports outages for wireless customers in Washington, Oregon and Alaska*, Q13 FOX (Oct. 3, 2018, 6:53 p.m.), <https://q13fox.com/2018/10/03/att-reports-widespread-outages-for-wireless-customers-in-washington-oregon-and-alaska/> (Q13 Fox article); Paul Roberts, *Northwest's cell networks disrupted after 'presidential alert' text*, SEATTLE TIMES (Oct. 3, 2018, 6:24 p.m.), <https://www.seattletimes.com/business/regions-cell-networks-disrupted-after-presidential-text-alert/> (Seattle Times article).

⁷⁴ *Id.*

⁷⁵ See, e.g., *Wired* article (reporting that “[p]eople on every major carrier, with both old and brand new phones, reported not receiving the message”); Connor Pregizer, *If you didn't get that Presidential Alert text message today, you're not alone*, KPAX (Oct. 3, 2018), <https://kpax.com/news/montana-news/2018/10/03/if-you-didnt-get-that-presidential-alert-text-message-today-youre-not-alone/> (KPAX article) (reporting that “even people in the same room were split in terms of who received the message and who did not,” with the author noting that of his two phones, “one received the alert twice, while the other did not receive the message at all”).

⁷⁶ Olivia Rudgard, *Technical problems for presidential disaster alert phone message test as many Americans don't receive it*, THE TELEGRAPH (Oct. 4, 2018), <https://www.telegraph.co.uk/technology/2018/10/04/first-test-us-disaster-alert-system-runs-technical-problems/> (Telegraph article) (“Many of those stating that they had not received a presidential alert on Wednesday appeared to be users of new iPhones such as the iPhone X.... Experts suggested that the newer phones had not undergone earlier tests which had been used to troubleshoot issues ahead of the (continued....)”).

service provided by a particular wireless provider,⁷⁷ to explain why some people did not receive the WEA test message. However, most media coverage notes that failure to receive the test message was not unique to any particular device, location, or wireless provider.⁷⁸

Data received through the Public Safety Support Center⁷⁹ and anecdotally to PSHSB staff also report delays in delivery or service interruptions related to receiving the WEA test message. Three reports to the Public Safety Support Center reported receiving the message later than the test was administered, ranging from five minutes to 30 minutes. Five consumers noted that receiving the test message caused some interruption to their voice, text, or data service.

2. Duplicate Messages

Several consumers reported receiving multiple WEA test messages delivered to their handsets following the test.⁸⁰ Of the data reported through the Public Safety Support Center and to PSHSB staff, 11 reported receiving duplicate test messages, ranging from a couple messages received in the minutes after the test to tens of messages in the following days. One consumer reported through the Public Safety Support Center that they received the test message 100 times in 36 hours, with the message coming in waves of 4-5 alerts in a 20-30-minute span. Another tweeted about receiving the alert 28 times. Some reports indicated that receiving multiple alerts was related to service, for example, having the test message pop up every time upon call completion.

3. Audio and Vibration Cadence Issues

The majority of issues reported among those that received the WEA test message concern the alert signal or vibration cadence.⁸¹ From the Public Safety Support Center data reported, 10 indicated they did not receive the alert signal or the vibration cadence with the alert. Additionally, eight reported that they did not receive the alert signal or the vibration cadence but expected as much because of their phone's audio setting. Everbridge similarly reported that most respondents who reported receiving the alert did not hear the alert signal, "likely because they put their phone on silent."⁸² Conversely, in four instances reported through the Public Safety Support Center, the alert made either the alert signal tone or the vibration

(Continued from previous page) _____
national alert."); *Wired* article (noting that newer phones, which may have been released after FEMA's more recent local or state-wide tests, may have firmware that reacts unexpectedly to the emergency alert system).

⁷⁷ Allie Gross, *Presidential alert trial shows 'technology fails'*, JACKSON HOLE DAILY (Oct. 7, 2018), https://www.jhnewsandguide.com/jackson_hole_daily/local/article_971040f1-68eb-5809-a599-de8d6a4e694d.html (*Jackson Hole Daily* article) (noting that anecdotally "Verizon customers had the biggest issues, but no provider seems to have pulled off the test without any failures.").

⁷⁸ See, e.g., Max Cohan, *Thousands didn't receive presidential alert*, LOCAL NEWS 8 ABC (Oct. 4, 2018), <https://www.localnews8.com/news/thousands-didn-t-receive-presidential-alert/803087405> ("No connection between wireless carrier and reception of the alert is currently known."); *Jackson Hole Daily* article (noting that no provider appears to have distributed the nationwide WEA test without any failures); *Wired* article ("People on every major carrier, with both old and brand new phones, reported not receiving the message.").

⁷⁹ The Public Safety Support Center (PSSC) is the Commission's public-facing portal to request support from PSHSB and notify it of problems or issues impacting the provision of emergency services. The PSSC also receives consumer feedback on specific alerting tests, including the nationwide test.

⁸⁰ See also Brandon Behle and Michael Finney, *Didn't get the nationwide alert? This might be why, and here's how to fix it*, ABC 7 NEWS (Oct. 3, 2018), <https://abc7news.com/didnt-get-the-nationwide-alert-this-might-be-why/4405202/> (*ABC 7 News* article) (many people reporting that they got the alert multiple times); *Telegraph* article (some phones appear to have received multiple messages); *KPAX* article (the author notes his phone received the alert twice).

⁸¹ See 47 CFR §§ 10.520, 10.530 (requiring WEA alerts to contain an audio attention signal and vibration cadence).

⁸² Everbridge Blog Post.

cadence, despite the phone’s ringtone setting set to silent/vibrate only or Do Not Disturb. Through the Public Safety Support Center and anecdotally, PSHSB received reports of six mobile phones where the alert signal tone was received but the alert message was not.

4. Accessibility Issues

Individuals with disabilities and representatives of organizations representing people with disabilities were invited to electronically submit observations in PSHSB’s Public Safety Support Center portal regarding complications with accessible WEA alerts. Informal feedback was also obtained from input directly emailed to the Commission. The feedback received about the WEA test identified several accessibility issues, indicating that accessibility may have been compromised due to the lack of the required vibration or audio attention signals.⁸³

B. The Nationwide EAS Test

Test participants reported complications with the test that included equipment configuration issues, equipment failures, failure to update equipment software, audio quality issues, alerting source issues, and clock errors. As in 2016 and 2017, EAS Participants reported the complications they experienced in two ways. First, ETRS Form Three provided a series of checkboxes that allowed EAS Participants to assign categories to the issues they experienced. These categories were based on the complications observed during the 2017 nationwide EAS test, which included audio quality issues, equipment performance issues, software update issues, and user error.

Table 11 shows the categories of complications reported by test participants. This year, filers were asked to report whether they experienced complications during receipt or retransmission in additional categories: software out-of-date, equipment configuration issues, and equipment failure. 97.4% of filers reported no complications in retransmission (up from 88.3% in 2017). 1.6% of filers reported experiencing audio quality issues, which is a decrease from the 4% of test participants that reported audio quality issues in 2017.⁸⁴ 0.5% of filers reported that their software was out-of-date, which caused complications upon receipt of the alert.

Table 11. Complications Experienced By Test Participants

Complication	Experienced During Receipt		Experienced During Retransmission	
	#	%	#	%
No Complications	15915	95.1%	15684	97.4%
Audio Quality Issues	276	1.6%	n/a	n/a
Equipment Configuration Issues	129	0.8%	139	0.9%
Software Out-of-Date	78	0.5%	9	0.06%
Equipment Failure	76	0.5%	39	0.2%
User Error	17	0.1%	10	0.06%
Other	315	1.9%	267	1.7%

⁸³ See 47 CFR §§ 10.520, 10.530 (accessibility requirements for WEA-capable devices).

⁸⁴ 2017 Nationwide EAS Test Report at 13.

Second, Form Three allowed EAS Participants to report complications by describing them in “explanation” text fields. **Table 12** categorizes the responses received in those text fields. The most notable complications reported by test participants include equipment failures, monitoring source failures, failure to update equipment software or firmware, equipment configuration issues, IPAWS access errors, and audio quality issues.

Table 12. Explanations Reported By Test Participants.⁸⁵

Specific Cause of Complication	Explanations in Receipt and Retransmission	
	#	%
Equipment failure	504	2.9%
Monitoring source failure	217	1.2%
Software and/or Firmware Issue	215	1.2%
Configuration issue	160	1.2%
IPAWS access error	80	0.5%
Audio quality (incorporates no audio)	68	0.4%
Power and/or Internet outage	57	0.3%
System clock error ⁸⁶	54	0.3%
Equipment struck by lightning	25	0.01%
User error	10	0.06%
Force Tuning Retransmission Issue	9	0.05%

1. Equipment Performance Issues

There were 504 test participants that reported equipment performance issues involving antenna, reception, and hardware issues. Of these explanations of equipment failure issues, 144 were on alert receipt, and 360 on retransmission. Of those explaining issues on receipt, 95 were radio broadcasters, 21 television broadcasters, 26 cable providers, and two IPTV providers. Of those explaining issues on retransmission, there were 172 radio stations, 119 cable providers, 58 television stations, six IPTV providers, and five wireline video systems. Participants cited comb generator failure, receiver and tuner issues, and equipment out for repair.

2. Equipment Configuration

There were 160 test participants that provided detailed explanations of EAS equipment configuration issues. This result represents a reduction from the 206 reported equipment configuration issues from the

⁸⁵ Table 12 reflects the percentage of Form Three filers that offered explanations of their complications.

⁸⁶ “System clock error” refers to issues with the clock setting on EAS equipment, which, if improperly set, may cause the alert to either expire upon arrival or retransmit much later in the day.

previous year.⁸⁷ Of these explanations of equipment configuration, 19 were on alert receipt, and 141 on retransmission. Of those explaining issues on receipt, 10 were radio broadcasters, five television broadcasters, three cable providers, and one IPTV provider. Of those explaining issues on retransmission, 73 were radio broadcasters, 28 television broadcasters, 33 cable providers, and seven IPTV providers. Participants cited failure to configure the nationwide location code or the NPT code and message forwarding issues. Most test participants that reported complications related to equipment configuration also reported that they had successfully identified and corrected the cause of those complications.

3. Failure to Update Software

There were 215 test participants that provided detailed explanations of complications related to failure to update EAS equipment software, a significant increase from the 98 test participants that reported software issues in 2017.⁸⁸ Of these explanations, 96 were on alert receipt, and 119 on retransmission. On receipt, there were explanations from 81 radio broadcasters, seven television broadcasters, and eight cable providers. On retransmission, there were explanations from 86 radio broadcasters, 19 cable providers, 13 television broadcasters, and one IPTV provider. The impact of failing to install recent software updates varied. Some test participants reported that failure to install a software update prevented their equipment from receiving the alert, while most reporting software issues with their equipment were unable to successfully retransmit the alert. A majority of test participants that reported needing updates also reported that they have since made the necessary updates.

4. Alert Source Issues

This year, data was analyzed regarding test participants who provided explanations of complications with monitoring sources as assigned by their State EAS Plan.⁸⁹ There were 217 test participants that provided detailed explanations related to failure to receive or retransmit the test from their assigned monitoring source. Of these explanations, 126 were on alert receipt, and 91 were on retransmission. On receipt, there were explanations from 112 radio broadcasters, seven cable providers, five television broadcasters, and two IPTV providers. On retransmission, there were explanations from 81 radio broadcasters, five television broadcasters, four cable providers, and one IPTV provider. Most participants cited failure to receive a strong signal from their LP-1 or LP-2 station, while some stated that no signal was received at all.

Eighty test participants provided detailed explanations of complications related to accessing IPAWS. Of these explanations, 36 were on receipt, and 44 were on retransmission. On receipt, there were explanations from 32 radio broadcasters, three television broadcasters, and one cable provider. On retransmission, there were explanations from 37 radio broadcasters, five television broadcasters, one cable provider, and one IPTV provider. Most test participants cited the expiration of their IPAWS security certificate as the cause of the error, and many reported that they have since renewed the necessary security certificates.

5. Audio Issues

There were 68 test participants that provided explanations about audio quality complications upon alert receipt and/or retransmission, an improvement from the 1,056 test participants reporting audio issues in 2017. 276 test participants also noted audio issues with receipt without further explanation. Of the audio issue explanations, 12 were on alert receipt, and 56 on retransmission. On receipt, there were explanations from 10 radio broadcasters and two television broadcasters. On retransmission, there were explanations from 45 radio broadcasters, nine television broadcasters, and two cable providers. Many test participants reported audio quality issues that included background noise, static, distortion, echoing, low

⁸⁷ 2017 *Nationwide EAS Test Report* at 14.

⁸⁸ *Id.*

⁸⁹ See 47 CFR §§ 11.21(a)(4); 11.52(d)(1).

volume, and slow audio playback. Some test participants attributed their issues to a weak signal from the over-the-air sources they were monitoring or EAS equipment malfunction. Of the 56 audio issue explanations on retransmission, 31 reported first receiving the test through IPAWS; most cite equipment malfunction as the reason for audio issues with retransmission of the test when first received through IPAWS.

6. Accessibility Issues

Individuals with disabilities and representatives of organizations representing people with disabilities were invited to electronically submit observations in PSHSB's Public Safety Support Center portal regarding complications with accessible alerts. Informal feedback was also obtained from input directly emailed to the Commission. Filers noted that the manner in which the EAS test was displayed in some cases may not be accessible to people with disabilities.⁹⁰ Specifically, text crawls were often reported as being too fast and unreadable, overlapping with closed captions, and displaying poor color contrast; and the audio was often reported as being of poor quality or absent. Overall, the issues raised largely mirrored those identified in the *2017 Nationwide EAS Test Report*.⁹¹

VI. NEXT STEPS

The Commission places the highest priority on ensuring that emergency management authorities and first responders have effective emergency alerting tools. In this regard, and informed by the 2017 nationwide EAS test results, the Bureau has taken steps to improve the delivery of alerts. Over the past year, PSHSB has held an alerting workshop with FEMA and a webinar with the FCC's Office of Intergovernmental Affairs that provided information about alerting best practices, including the importance of keeping EAS equipment and its software up-to-date.⁹² We also revised ETRS Form Three to address accessibility of the test for people with disabilities and followed up with broadcast stations with noted captioning issues. The 2018 test results indicate that EAS Participants have improved in their ability to successfully alert the public using the EAS, particularly through the increase in test participants who first received the alert through IPAWS.

To help address remaining areas for improvement, PSHSB should conduct targeted outreach to address commonly reported operational complications and to improve participation in the nationwide test. In particular, PSHSB should:

- Provide guidance, such as through Public Notices and direct follow-up with EAS Participants, to improve the accuracy of reporting in ETRS and to address commonly reported complications, such as the importance of software updates and proper equipment configuration, and following State EAS Plan monitoring assignments.
- Promote accessibility through continued outreach to EAS Participants, particularly those referenced in filings with the Public Safety Support Center and other Commission records, to ensure future coordination of alert crawl with closed captioning, and to ensure future EAS messages are provided with appropriate crawl speed for readability, high contrast text and background colors, and adequate audio quality. Issue a Public Notice to remind EAS Participants about the relevant rules and best practices to provide accessible EAS alerts. Explore mechanisms to improve feedback solicitation and collection for both the public and in ETRS regarding accessibility issues for non-English speakers and people with disabilities.

⁹⁰ See *id.* at § 11.51. See, e.g., NAD Memo at 2.

⁹¹ *2017 Nationwide EAS Test Report* at 16.

⁹² See *Public Safety and Homeland Security Bureau Announces Agenda for Emergency Alerting Roundtable Discussion*, Public Notice, 33 FCC Rcd 4619 (PSHSB 2018); *Public Safety and Homeland Security Bureau Announces Emergency Alerting Webinar on July 25*, Public Notice, 33 FCC Rcd 6719 (PSHSB 2018).

- Reach out to Low Power broadcasters through a variety of means, including directed mailings and a webinar, to improve their participation in the nationwide EAS test.

2018 marked the first nationwide test of WEA. Based on the reports of inconsistent WEA delivery and performance during the nationwide test, the Bureau recommends that additional measures be taken to improve the reliability and effectiveness of WEA:

- PSHSB notes that the Commission is currently examining issues related to measuring and reporting of WEA performance, including whether to adopt standards or benchmarks for WEA performance and delivery.⁹³ While PSHSB does not want to prejudge the pending proceeding before the Commission, PSHSB recommends the Commission consider the WEA test performance survey results in its assessment of next steps. Accordingly, PSHSB will place the relevant surveys in the associated docket for that proceeding. PSHSB also recommends issuing a Public Notice letting the public know that PSHSB is putting the material from the nationwide test in the docketed proceeding and seeking comment on the survey results.
- PSHSB recommends that the Commission continue to develop tools for alert originators to use WEA more effectively, such as the development of a WEA database that provides information on the availability of WEA within their jurisdictions.
- PSHSB recommends exploring potential opportunities with state and local alert originators to determine alternative means for gathering and assessing data regarding WEA delivery.

PSHSB has also identified discrete WEA operational issues that can be improved upon. Accordingly, over the next year, PSHSB will:

- Work with wireless carriers serving Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands to encourage and facilitate their election to participate in WEA.
- Conduct outreach to wireless providers to ensure the presence and delivery of the required WEA audio tone and vibration cadence to ensure that such alerts are accessible to individuals with disabilities.

IX. CONCLUSION

The 2018 nationwide WEA and EAS test successfully demonstrated the effectiveness of WEA and the EAS as nationwide alerting tools, as well as the capability of IPAWS to disseminate these alerts to the public through the nation's alert and warning infrastructure.

This year's test also highlights several areas in which WEA and the EAS can continue to improve. PSHSB will continue to work with FEMA, the State Emergency Communications Committees, Participating EMS Providers and other stakeholders, individual EAS Participants and other stakeholders, and the public to address the issues raised in the test and ensure that WEA and the EAS can deliver timely and accurate national alerts and critical emergency information to the public.

⁹³ *Amendment to Part 11 of the Commission's Rules Regarding the Emergency Alert System; Wireless Emergency Alerts*, PS Docket Nos. 15-94 and 15-91, Report and Order and Further Notice of Proposed Rulemaking, 33 FCC Rcd 7086, 7105, paras. 46-49 (2018).

APPENDIX: HOW WEA AND EAS WORK

Wireless Emergency Alerts

In 2008, pursuant to the Warning, Alert and Response Network (WARN) Act,⁹⁴ the Commission adopted rules allowing CMS Providers to voluntarily deliver timely and accurate emergency alerts over subscribers' mobile devices.⁹⁵ The WARN Act required that the Commission undertake a series of actions, including the establishment and convening of an advisory committee to recommend technical requirements for WEA.⁹⁶ Accordingly, the Commission formed the Commercial Mobile Service Alert Advisory Committee (CMSAAC).⁹⁷ The CMSAAC submitted its report to the Commission on October 12, 2007, as required by the WARN Act.⁹⁸ The Commission subsequently promulgated rules governing WEA, within the timeframes established by the WARN Act.⁹⁹ The WARN Act gives the Commission authority to adopt "relevant technical standards, protocols, procedures and other technical requirements based on the recommendations of such Advisory Committee necessary to enable commercial mobile service alerting capability for commercial mobile service providers that voluntarily elect to transmit emergency alerts."¹⁰⁰ The WARN Act also gives the Commission authority to adopt procedures whereby CMS Providers could specify their intent to the Commission to participate in WEA.¹⁰¹ Many CMS Providers, including the four nationwide wireless carriers, elected to participate in WEA, at least in part.¹⁰² As of March 4, 2019, WEA has been used to issue nearly 44,000 emergency alerts, including severe weather warnings, evacuate and shelter-in-place alerts, and AMBER Alerts¹⁰³ since it was deployed in April 2012.¹⁰⁴

The WEA system is a tool for authorized federal, state and local government entities to geographically target Presidential, Imminent Threat, and AMBER Alerts to the WEA-capable mobile devices of Participating CMS Providers' subscribers.¹⁰⁵ As depicted in Figure 1 below, a WEA Alert Message is sent by an authorized federal, state or local government entity using the Common Alerting Protocol

⁹⁴ On October 13, 2006, the President signed the Security and Accountability for Every Port (SAFE Port) Act into law. Title VI of the SAFE Port Act, also known as the WARN Act, establishes a process for the creation of a national mobile alerting system, now known as WEA, whereby Participating CMS Providers transmit emergency alerts to their subscribers. *See* Warning, Alert and Response Network (WARN) Act, Title VI of the Security and Accountability For Every Port Act of 2006, 120 Stat. 1884, *codified at* 47 U.S.C. § 1200, *et seq.* (2006) (WARN Act).

⁹⁵ *See* 47 CFR Part 10.

⁹⁶ WARN Act §§ 603(a), (d), 47 U.S.C. § 1203(a), (d).

⁹⁷ *See* Notice of Appointment of Members to the Commercial Mobile Service Alert Advisory Committee, Agenda for December 12, 2006 Meeting, *Public Notice*, 21 FCC Rcd 14175 (PSHSB 2006).

⁹⁸ *See* Federal Communications Commission Commercial Mobile Service Alert Advisory Committee (CMSAAC), PMG-0035 Commercial Mobile Alert Service Architecture and Requirements, at 66 (2007) (*CMSAAC Report*).

⁹⁹ WARN Act § 602(a), 47 U.S.C. § 1202(a) (requiring the Commission to promulgate technical standards for WEA within 180 days of receipt of the CMSAAC's recommendations); *id.* at § 602(c), 47 U.S.C. § 1202(c) (requiring the Commission to promulgate requirements for noncommercial educational broadcast stations or public broadcast stations to enable the distribution of geographically targeted messages within 90 days of the publication of its technical standards); *id.* at § 602(b), 47 U.S.C. § 1202(b) (requiring the Commission to promulgate election procedures for CMS Providers within 120 days of the publication of its technical standards); *id.* at § 602(f), 47 U.S.C. § 1202(f) (requiring the Commission to require by regulation technical testing for commercial mobile service providers that elect to transmit emergency alerts and for the devices and equipment used by such providers for transmitting such alerts).

¹⁰⁰ *Id.* at § 602(a), 47 U.S.C. § 1202(a).

¹⁰¹ *Id.* at § 602(b), 47 U.S.C. § 1202(b). Under the WARN Act, CMS Providers could elect to participate in whole, in part, or not at all. *Id.* at § 602(b)(1)(B), 47 U.S.C. § 1202(b)(1)(B). CMS Providers who intended to participate (continued....)

(CAP) to the Federal Emergency Management Agency (FEMA)-operated Alert Aggregator via a secure, Internet-based interface (the A-Interface) where it is authenticated, validated and subsequently delivered to FEMA's Alert Gateway (the B-Interface).¹⁰⁶ At the FEMA Alert Gateway, the Alert Message is prepared for delivery to the Participating CMS Provider by being converted to Commercial Mobile Alert for C-Interface (CMAC) format to render it readable by WEA-capable mobile devices. The Alert Message is then disseminated across a secure Internet-based interface (the C-Interface) to the Participating CMS Provider's Alert Gateway (CMSP Gateway) for distribution to mobile customers over cell broadcast (CMSP Infrastructure).¹⁰⁷

(Continued from previous page) _____

in WEA were required to specify their intent to the Commission in writing. *See id.* at § 602(B)(2)(A), 47 U.S.C. § 1202(B)(2)(A) (requiring that “within 30 days after the Commission issues its order under [Section 602(b)], each licensee providing commercial mobile service shall file an election with the Commission with respect to whether or not it intends to transmit emergency alerts”).

¹⁰² *See* FCC, *Master CMAS Registry*, <https://www.fcc.gov/pshs/docs/services/emas/MasterCMASRegistry.xls> (last updated Feb. 14, 2013); PS Docket No. 08-146 (containing a record of all Participating CMS Providers' elections to participate in WEA). *See also* Policies Regarding Mobile Spectrum Holdings and Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, WT Docket No. 12-269 and Docket No. 12-268, Report and Order, 29 FCC Rcd 6133, 6206 & n.502 (2014) *citing* Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, WT Docket No. 11-186, *Sixteenth Report*, 28 FCC Rcd 3700, 3736-37, para. 26 (observing that “there are four nationwide providers in the U.S. with networks that cover a majority of the population and land area of the country – Verizon Wireless, AT&T, Sprint, and T-Mobile –” and referring to other providers with “networks that are limited to regional and local areas” as “non-nationwide providers.”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial mobile Services, WT Docket No 15-125, *Eighteenth Report*, 30 FCC Rcd 14515, 14520, para. 9 (2015).

¹⁰³ Data based on PSHSB staff conversation with FEMA on March 11, 2019. The AMBER (America's Missing: Broadcast Emergency Response) program is a nationwide alerting program designed to help bring missing children to safety. *See* Office of Justice Programs, *AMBERAlert.gov*, <http://www.amberalert.gov/about.htm> (last visited Mar. 11, 2019).

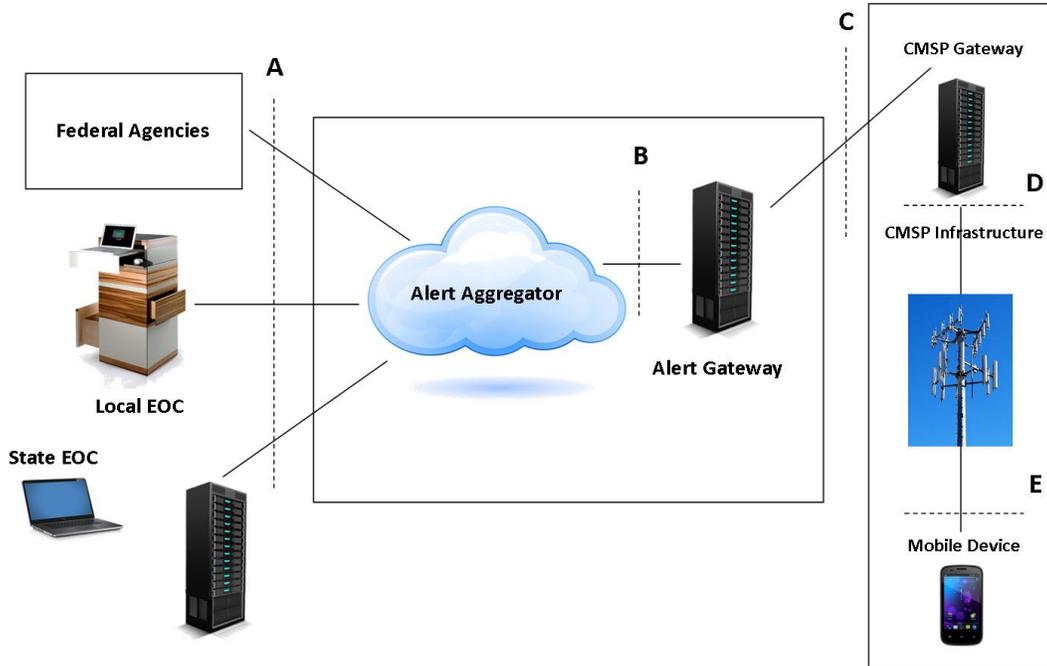
¹⁰⁴ *See Public Safety and Homeland Security Bureau Sets Timetable in Motion for Commercial Mobile Service Providers to Develop a System That Will Deliver Alerts to Mobile Devices*, PS Docket No. 07-287, Public Notice, 24 FCC Rcd 14388 (PSHSB 2009).

¹⁰⁵ *See, e.g.*, 47 CFR § 10.450 (geo-targeting); § 10.430 (character limit); § 10.400 (classification).

¹⁰⁶ *See infra* Figure 1 (WEA Architecture). CAP is an open, interoperable, XML-based standard that can include multimedia such as streaming audio or video. *See* OASIS CAP v1.2 (IPAWS Profile for the OASIS Common Alerting Protocol IPAWS USA). CAP messages contain standardized fields that facilitate interoperability between and among devices. *See id.*

¹⁰⁷ From a technical standpoint, the WEA system currently deployed by FEMA and Participating CMS Providers is based on standards created by the Alliance for Telecommunications Industry Solutions (ATIS), the Telecommunications Industry Association (TIA) (jointly, ATIS/TIA), and the 3rd Generation Partnership Project (3GPP). *See CSRIC IV WEA Messaging Report* at 7. We note that nothing in the WARN Act or the Commission's rules requires WEA to be a cell-broadcast-based service.

Figure 1. WEA Architecture



Currently, Participating CMS Providers’ WEA infrastructure removes Alert Message metadata, including a description of the geographic target area for the Alert Message and the Alert Message’s expiration time, and then transmits the Alert Message content to their subscribers’ WEA-capable devices. While the Commission’s WEA rules are technologically neutral, most Participating CMS Providers use cell broadcast technology to transmit WEA Alert Messages to their subscribers.¹⁰⁸ When the Alert Message is received by a WEA-capable mobile device, it is prominently presented to the subscriber as long as the subscriber has not opted out of receiving Alert Messages of that type.¹⁰⁹

¹⁰⁸ See CSRIC V, Working Group Two, Wireless Emergency Alerts – Recommendations to Improve Geo-targeting and Offer Many-to-One Capabilities, Final Report and Recommendations 8 (2016); *but see* Letter from Rebecca Murphy Thompson, EVP and General Counsel, Competitive Carriers Association, to Marlene Dortch, Secretary, FCC, PS Docket No. 15-91, at 2 (filed Oct. 10, 2017) (stating that some carriers offer WEA using a software application, rather than cell broadcast).

¹⁰⁹ See Joint ATIS/TIA CMAS Mobile Device Behavior Specification (ATIS-TIA-J-STD-100). Subscribers’ right to opt out of WEA Alert Message receipt extends to all but the Presidential Alert. See 47 CFR § 10.280.

The Emergency Alert System

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.¹¹⁰ The EAS is the successor to prior national warning systems Control of Electromagnetic Radiation (CONELRAD), established in 1951; and the Emergency Broadcasting System (EBS), established in 1963.¹¹¹ The FCC, in conjunction with FEMA and the NWS, implements EAS at the federal level.¹¹² The respective roles these agencies play are defined by a 1981 Memorandum of Understanding between FEMA, NWS and the FCC;¹¹³ a 1984 Executive Order;¹¹⁴ a 1995 Presidential Statement of EAS Requirements;¹¹⁵ and a 2006 Public Alert and Warning System Executive Order.¹¹⁶ 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.

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.¹¹⁷ However, a Presidential alert has never been issued, and prior to the 2011 Nationwide EAS Test, 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 end-to-end testing of a national alert.¹¹⁸

¹¹⁰ See, Review of the Emergency Alert System, *Second Further Notice of Proposed Rulemaking*, 25 FCC Rcd 564, 565, para. 2 (2010).

¹¹¹ 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.

¹¹² 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*).

¹¹³ 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*.

¹¹⁴ See Assignment of National Security and Emergency Preparedness Telecommunications Function, Exec. Order No. 12472, 49 Fed. Reg. 13471 (1984).

¹¹⁵ See *1995 Presidential Statement*.

¹¹⁶ See *Public Alert and Warning System*, Exec. Order No. 13407, 71 Fed. Reg. 36975 (June 26, 2006) (*Executive Order*).

¹¹⁷ See 47 CFR Part 11.

¹¹⁸ See *2011 EAS Nationwide Test Report* at 7, n.13.

Alerting via IPAWS

EAS and WEA alerts may be distributed over the Internet through the Integrated Public Alert and Warning System (IPAWS), illustrated in Figure 3 below.¹²⁰ As of June 30, 2012, EAS Participants are required to be able to receive EAS alerts formatted in Common Alerting Protocol (CAP)¹²¹ from authorized emergency alert initiators over the Internet via IPAWS. CAP-formatted alerts can include audio, video or data files, images, multilingual translations of alerts, and links providing more detailed information than what is contained in the initial alert (such as streaming audio or video).¹²² An EAS Participant that receives a CAP-formatted message can utilize the CAP-formatted content to generate messages in synchronous audio and visual formats, which then can be broadcast to local viewers and listeners.¹²³ CAP also provides each alert with a unique alert identifier and supports alert authentication through the provision of a digital signature and an encryption field that enables greater protection of the CAP message.¹²⁴

¹²⁰ FEMA, Integrated Public Alert & Warning System, <https://www.fema.gov/integrated-public-alert-warning-system> (last visited Mar. 8, 2019).

¹²¹ 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*, EB Docket 04-296, Fourth Report and Order, 26 FCC Rcd 13710, 13719, para. 20 (2011) (*Fourth Report and Order*). CAP is an open, interoperable standard developed by the Organization for the Advancement of Structure Information Standards (OASIS), and it incorporates an XML-based language developed and widely used for web documents. 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, 27 FCC Rcd 642, 648, para. 10 (2012), *pet. denied in Multicultural Media, Telecom and Internet Council and the League of United Latin American Citizens, Petitioners, v. FCC*, D.C. Cir., 873 F3d 932 (Oct. 17, 2017). CAP messages contain standardized fields that facilitate interoperability between and among devices, and are backwards-compatible with the EAS Protocol. See *id.*

¹²² See *id.* However, any data contained in a CAP-formatted message beyond the EAS codes and audio message (if present), such as enhanced text or video files, can be utilized locally by the EAS Participant that receives it, but cannot be converted into the EAS Protocol and thus cannot be distributed via the daisy chain process, as reflected in the part 11 rules. See, e.g., 47 CFR § 11.51(d), (g)(3), (h)(3), (j)(2).

¹²³ See 47 CFR § 11.51(d), (g)(3), (j)(2).

¹²⁴ See OASIS, Common Alerting Protocol Version 1.2 (2010), available at <http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2-os.html> (last visited Mar. 8, 2019).

Figure 3. IPAWS Architecture

