Report:
August 7, 2019 Nationwide EAS Test

May 2020

Public Safety and Homeland Security Bureau

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

TABLE OF CONTENTS

I. SUMMARY

On August 7, 2019, the Federal Emergency Management Agency (FEMA), in coordination with the Federal Communications Commission (Commission or FCC), conducted a nationwide test of the Emergency Alert System (EAS) using only the broadcast-based distribution system, otherwise known as the daisy chain. The purpose of the 2019 test was to evaluate the readiness of EAS Participants—such as radio and television stations, cable television systems, direct broadcast satellite (DBS), Satellite Digital Audio Radio Service (SDARS), digital audio broadcasting systems, and wireline video systems—to receive and, in turn, retransmit the alert to other stations, in the absence of Internet connectivity.[1] This was the fifth EAS nationwide test.[2]

A final analysis of the test finds that a large majority of the EAS Participants successfully received the national periodic test code, or NPT, and, as required by our rules, retransmitted the NPT to other EAS Participants. The test thus demonstrated that the national EAS distribution architecture is largely effective as designed. As anticipated, the test also shed light on challenges that impeded the ability of some EAS Participants to receive and/or retransmit the NPT. The overall results of the 2019 nationwide EAS test demonstrate the following:

- The broadcast-based distribution method is largely effective, with the capability to reach 82.5% of the EAS participants;
- Participation rates by EAS Participants in the nationwide test have increased since last year;
- Success of the broadcast-based distribution system is dependent upon the proper functioning of the initial stations in the daisy chain, which must be able to successfully receive and retransmit the alert to the stations below them; and
- Stations increase their chances of receiving and retransmitting the alert when they monitor multiple reliable monitoring sources. Multiple monitoring sources add redundancy to the system. When one source fails, the other helps to maximize the potential for successful receipt and retransmission of the alert.[3]

This report provides an analysis of the 2019 nationwide EAS test results. Specifically, it offers insight on the functionality of the broadcast-based EAS distribution architecture and identifies areas for improvement regarding technical and operational performance. The report includes recommended next steps that the Public Safety and Homeland Security Bureau (PSHSB or the Bureau) has taken since the 2018 nationwide EAS test and plans to take in light of this year's results. Similarly, it recommends actions that EAS Participants can take to improve the reliability and reach of the EAS.

II. BACKGROUND

The EAS provides the President with a means to address the American public during times of national emergency. It also provides authorized state and local alert originators an effective means to transmit

[1] *See Public Safety and Homeland Security Bureau Announces Nationwide Test of the Emergency Alert System on August 7, 2019 and Opens the EAS Test Reporting System for 2019 Filings,* Public Notice, 34 FCC Rcd 4347 (PSHSB 2019).

[2] Previous EAS national tests were conducted in November 2011, September 2016 and 2017, and October 2018.

[3] EAS Participants are required to monitor two sources for EAS messages that are formatted in accordance with the EAS Protocol. *See* 47 CFR §11.52(d)(1). In addition, EAS Participants must monitor IPAWS for CAP-based alerts. *See* 47 CFR §11.52(d)(2).

local and/or statewide emergency information,[4] such as severe weather alerts and America's Missing: Broadcast Emergency Response (AMBER) Alerts.[5] The Commission, in conjunction with FEMA, implements the EAS at the federal level.

FCC rules require EAS Participants to have the capability to receive and transmit Presidential Alerts disseminated over the EAS.[6] There are two methods by which EAS alerts may be distributed. Under the traditional broadcast-based distribution structure the EAS transmits an alert through a pre-established hierarchy of broadcast, cable, and satellite systems, starting with the initial delivery to the Primary Entry Point (PEP) stations.[7] Alerts are delivered using the EAS Protocol, a simple digital messaging protocol that delivers basic alert elements over the air.[8] The basic EAS Protocol lacks the capability to deliver separate audio and non-English text files and is dependent on radio reception for the quality of the audio.[9] The second method of distribution is over an Internet-based system—called the Integrated Public Alert and Warning System or IPAWS.[10] IPAWS alerts are formatted in the more sophisticated Common Alerting Protocol (CAP). CAP-formatted alerts initiated through IPAWS can include audio, video or data files, images, non-English translations of alerts, and links providing detailed information.[11] The

[4] 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 Feb. 5, 2020).

[5] The AMBER 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 May 4, 2020).

[6] *See* 47 CFR §§ 11.2(a), 11.11, 11.54.

[7] The Appendix includes more information on how the EAS works. This report includes limited comparisons with the previous year's test results because the differences in how the tests were conducted do not allow a one-for-one comparison in all instances. In past years, FEMA has distributed the nationwide EAS test through both the broadcast-based alert system as well as over the Internet using IPAWS. The Commission's rules require EAS Participants to be able to receive alerts from both IPAWS and the broadcast-based EAS structure. *See* 47 CFR §§ 11.51(d), 11.56(a). The 2018 test also included Wireless Emergency Alerts (WEA). *See* FCC, PSHSB, Report: October 3, 2018 Nationwide EAS Test (2018), https://docs.fcc.gov/public/attachments/DOC-356902A1.pdf (*2018 Nationwide EAS Test Report*).

[8] *See* Appendix, *infra*, at 23. *See also* 47 CFR § 11.31.

[9] 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. *See* FCC, PSHSB, Report: September 28, 2016 Nationwide EAS Test at 3 (2016), https://apps.fcc.gov/edocs_public/attachmatch/DOC-344518A1.pdf (discussing the value added from Internet-based alert distribution) (*2016 Nationwide EAS Test Report*).

[10] Letter from Alfred Kenyon, Chief, Customer Support Branch, IPAWS Program Office, National Continuity Programs, Department of Homeland Security – FEMA, to Marlene H. Dortch, Office of the Secretary, Federal Communications Commission (filed May 22, 2019) (on file in PS Docket No. 15-94) https://ecfsapi.fcc.gov/file/10522641001151/FCC%202019%20National%20EAS%20Test%20Date%20Notification%20-%20Final%20-%2020190522.pdf (*FEMA Letter*).

[11] EAS Participants can deliver to the public the rich data contained in a CAP-formatted message received directly from the IPAWS Internet feed, but when 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 transmit CAP-based features, such as digital audio or multiple languages, to the public.

Appendix contains additional information about the EAS, including a description of how the alerts are disseminated over the EAS.

III. THE 2019 NATIONWIDE EAS TEST

A. The Parameters of the 2019 Nationwide EAS Test

FEMA initiated the 2019 nationwide EAS test by sending the NPT message to the PEP stations for broadcast 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 NPT, they, in turn, broadcast the alert in their listening areas. The remaining broadcasters, cable television facilities, and other EAS Participants located in each LP's broadcast footprint receive the alerts from the LP stations and deliver the alerts to the public (or in the case of cable, to customers' set top boxes).

B. Participation in the Nationwide EAS Test

There are approximately 25,768 EAS Participants in the United States and its territories.[12] 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;[13] DBS services; and SDARS.[14] **Table 1** summarizes the participation rate in the 2019 nationwide EAS test.[15] Excluding duplicate filings,[16] EAS Participants made 20,250 unique filings,[17] with a participation rate of 78.6%, up from

[12] This total consists of the 17,637 radio broadcasters and 4,047 television broadcasters in the FCC's Consolidated Database System, the 4,080 headends active in the FCC's Cable Operations and Licensing System, Direct Broadcast Satellite (DBS) and Satellite Digital Audio Radio Service (SDARS) facilities. This methodology likely overestimates the 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 requirements, an analog or digital broadcast satellite station that rebroadcasts 100% of the hub station's programming would not be required to file in the EAS Test Reporting System (ETRS). *See* 47 CFR § 11.11(b).

[13] Wireline video systems are the systems of a wireline common carrier used to provide video programming service. *Id*. at § 11.2(c).

[14] *Id*. at § 11.11(a).

[15] Throughout this report, data are calculated to the nearest tenth, which, in some instances, results in percentage totals just slightly under or over 100%.

[16] EAS Participants submitted 23,131 filings in 2019. 2,881 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 test participant submitted Forms One, Two and Three through ETRS, this would be recorded as one filing, rather than three separate filings. The numbers cited in this report are slightly lower than those reported in the December 2019 Initial Public Notice to account for additional analysis. *See Public Safety and Homeland Security Bureau Announces Initial Findings Regarding 2019 Nationwide Test of Emergency Alert System*, Public Notice, 34 FCC Rcd 11938 (PSHSB 2019).

[17] Unique filings are a set of filings that represent the report of a single EAS Participant facility, such as a radio station or a cable headend, with any duplicate filings removed. 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.

76.3% in 2018.[18] Radio broadcasters had a participation rate of 82.0%, up from 78.7% last year, while television broadcasters' participation rate was 68.2%, up from 65.5% last year.[19] Cable systems, Internet Protocol Television (IPTV), and wireline video system participants had a participation rate of 73.4%, down from 76.4% last year.[20]

Table 1. Overview of Filings Received in ETRS[21]

EAS Participant Type	# of EAS Participants	Filings Received	Unique Filings Received	Filing Rate (Unique Filings)
Radio Broadcasters	17637	16411	14468	82.0%
Television Broadcasters	4047	2897	2759	68.2%
Cable Systems	4080	3415	2680	73.4%
IPTV Providers		289	253	
Wireline Video Systems		89	62	
Other[22]	n/a	30	28	n/a
All Total	**25,764**	**23,131**	**20,250**	**78.6%**

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,

[18] *See 2018 Nationwide EAS Test* at 10-11. 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.

[19] *See Id*.

[20] *Id.*

[21] 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.

[22] "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.

the language in which the alert was received, and details of any issues experienced during the test. 90.0% of test participants completed Forms One, Two, and Three, as required by the Commission's rules, which is up from 88.9% last year.[23] 7.2% of test participants submitted "day of test" results but failed to submit the detailed test results required by Form Three, which is a smaller percentage than last year's 8.5%. 3.2% of test participants failed to submit any test results, filing only their identifying information required by Form One. Wireline Video Systems had a high form completion rate of 98.4%, while the Other group had the lowest form completion rate of 85.7%.

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	14468	538	3.7%	1103	7.6%	12827	88.7%
Television Broadcasters	2759	46	1.7%	238	8.6%	2475	89.7%
Cable Systems	2680	55	2.1%	115	4.3%	2510	93.7%
IPTV Providers	253	6	2.4%	9	3.6%	238	94.1%
Wireline Video Systems	62	1	1.6%	0	0%	61	98.4%
Other	28	4	14.3%	0	0%	24	85.7%
All Total	**20,250**	**650**	**3.2%**	**1,465**	**7.2%**	**18,135**	**90.0%**

Table 3 compares the filing rate of Low Power broadcasters to that of all broadcasters.[24] LPFM participation in the test (55.9%) was lower than that of radio broadcasters overall (81.8%), but higher than last year's participation rate of 48.4%. Similarly, LPTV participation (48.1%) was lower than that of television broadcasters overall (63.5%), and slightly more than last year's participation rate (41.5%). As with last year's test, the low participation rate of Low Power broadcasters appears to have reduced the overall participation rate of all broadcasters. Of the 3,205 radio broadcasters that were expected to file but failed to do so, 964 were LPFM Broadcasters, or 30%. Of the 1,479 television broadcasters that were expected to file but failed to do so, 987 were LPTV broadcasters, or 66.7%.[25] Despite the low participation rate of low power broadcasters, we note that overall, Low Power filings increased by 292 in 2019 over 2018.

[23] 47 CFR § 11.61(a)(3)(iv). *2018 Nationwide EAS Test Report* at 11.

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

[25] *See also*, Table 7, *infra*, at 12 (describing the test results of Low Power participants).

Table 3. Overview of Filings Received from Broadcasters

	Filers Expected	Filings Rec'd[26]	Filing Rate	Form One Filed		Forms One and Two Filed		Forms One, Two, and Three Filed	
				#	%	#	%	#	%
All Radio Broadcasters	17637	14432	81.8%	538	3.7%	1103	7.6%	12791	88.6%
LPFM Broadcasters	2186	1222	55.9%	124	10.1%	178	14.6%	920	75.3%
All Television Broadcasters	4047	2568	63.5%	46	1.8%	238	9.3%	2284	88.9%
LPTV Broadcasters	1900	913	48.1%	31	3.4%	181	19.8%	701	76.8%

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.[27] The number of test participants reporting incorrectly their participant type has increased from last year. For example, 623 test participants reported that they served as National Primary (NP) stations,[28] which are tasked with the primary responsibility of receiving the Presidential Alert and delivering it to an individual state or portion of a state. In this regard, PEP stations are generally NPs. This number is up from the 539 test participants that reported to be NPs in 2018.[29] However, according to FEMA, there are 77 PEP stations nationwide. In 2018, 539 test participants reported that they served as NP stations, which is nearly one hundred fewer than in 2019.[30] Overall, this data suggests that this number appears to be higher than it should be; test participants need to better understand their role in the EAS and there is still room for improvement in this regard.

[26] Unique filings received.

[27] 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.

[28] 47 CFR § 11.18(a).

[29] *See 2018 Nationwide WEA and EAS Test Report* at 13.

[30] *Id*.

Table 4. EAS Designation by Participant Type[31]

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	387	141	841	1034	747	12147
Television Broadcasters	70	26	119	97	83	2318
Cable Systems	140	52	54	173	99	2418
IPTV Providers	17	4	4	19	12	220
Wireline Video Systems	9	0	3	17	5	40
Other	0	0	3	5	1	19
All Total	**623**	**223**	**1,024**	**1,345**	**947**	**17,162**

[31] Data reflects EAS designations as self-reported in Form One. Many EAS Participants, especially cable systems, marked more than one designation. This chart counts every time the EAS Designation was chosen, so the total number of designations selected exceeds the number of filers.

D. EAS Participant Monitoring of IPAWS

All EAS Participants are required to monitor IPAWS.[32] ETRS Form One asked EAS Participants to confirm whether their facility's equipment complied with this requirement. **Table 5** shows that 96.6% of test participants reported that they are complying with the IPAWS monitoring requirement—a very slight decrease from 96.8% in 2018.[33] However, the raw number for radio broadcasters increased from 13,494 in 2018 to 14,001 in 2019.[34] Wireline video systems slightly decreased their IPAWS monitoring rate from 95.2% in 2018 to 93.5% in 2019, representing a decrease by two filers (60 test participants reported monitoring IPAWS last year).[35]

Table 5. IPAWS Monitoring by Participant Type

EAS Participant Type	Test Participants	Monitoring IPAWS	
		#	%
Radio Broadcasters	14432	14001	97%
Television Broadcasters	2568	2504	97.5%
Cable Systems	2680	2516	93.9%
IPTV Providers	253	244	96.4%
Wireline Video System	62	58	93.5%
Other	28	26	92.9%
All Total	**20,023**	**19,349**	**96.6%**

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 August 7, 2019. **Table 6** shows test participants' success rates for alert receipt and retransmission. This data indicates that, overall, 82.5% of test participants successfully received the alert, and 79.8% retransmitted the alert. 81.6% of radio broadcasters successfully received the alert, and 79.6% successfully retransmitted it. 91.9% of wireline video systems successfully received the alert, though only 75.8% were able to successfully retransmit it. Television broadcasters reported that 85.1% successfully received the alert and 79.7% successfully retransmitted it.

We observe that the receipt and retransmission rates for the 2019 nationwide test were lower than in 2018. However, this was to be expected because in 2018, test participants were able to monitor both IPAWS and their designated monitoring station to receive the test alert, while in 2019 they were able to monitor only their designated monitoring station. In 2018, more than 50% of EAS Participants reported receiving

[32] 47 CFR § 11.52(d)(2).

[33] *2018 Nationwide EAS Test Report* at 14. 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.

[34] *Id.*

[35] *Id.*

the IPAWS message first.[36] That year, 95.7% of test participants successfully received the alert, and 92.1% successfully retransmitted the alert. We discuss issues with receipt and retransmission in connection with the 2019 test in greater detail below in Section IV.

Table 6. Test Performance by Participant Type

EAS Participant Type	Test Participants	Successfully Received Alert		Successfully Retransmitted Alert	
		#	%	#	%
Radio Broadcasters	14432	11775	81.6%	11495	79.6%
Television Broadcasters	2568	2185	85.1%	2046	79.7%
Cable Systems	2680	2293	85.6%	2186	81.6%
IPTV Providers	253	196	77.5%	187	73.9%
Wireline Video Systems	62	57	91.9%	47	75.8%
Other	28	22	78.6%	18	64.3%
All Total	**20,023**	**16,528**	**82.5%**	**15,979**	**79.8%**

Table 7 shows the performance of Low Power broadcasters in the 2019 nationwide EAS test. LPFM broadcasters had an alert receipt success rate of 68.7%, approximately 13 percentage points less than the rate of all radio broadcasters, and an alert retransmission success rate of 63.3%, approximately 16 percentage points less than the rate of all radio broadcasters. LPTV broadcasters had lower success rates than television broadcasters generally, but with a less than ten percentage point margin of difference than between the full and low-power radio broadcasters. 82.9% of LPTV broadcasters successfully received the alert, approximately two percentage points less than the rate of all television broadcasters. 72.4% of LPTV broadcasters successfully retransmitted the alert, approximately seven percentage points less than the rate of all television broadcasters.

[36] *Id.* at 17, Table 8. As Table 5 data shows, nearly 100% of test participants are equipped to receive IPAWS alerts.

Table 7. Test Results of Broadcasters

EAS Participant Type	Test Participants	Successfully Received Alert		Successfully Retransmitted Alert	
		#	%	#	%
All Radio Broadcasters	14432	11775	81.6%	11495	79.6%
LPFM Broadcasters	1222	839	68.7%	773	63.3%
All Television Broadcasters	2568	2185	85.1%	2046	79.7%
LPTV	913	757	82.9%	661	72.4%

F. Language of Alert

Form Three asked EAS Participants to report the languages in which they received and retransmitted the test alert. **Table 8** shows the language of the alerts that were received and retransmitted by test participants. In previous years, EAS Participants that first obtained the test alert via IPAWS received English and Spanish versions of the test alert that they could transmit to the public in accordance with their equipment's configuration. This year, the test alert message was sent only in English. The table below reflects the number of test participants who elected to translate the message into Spanish.

Table 8. 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	10834	14	20	10615	16	18
Television Broadcasters	1918	18	33	1781	21	44
Cable Systems	2104	0	90	1968	0	131
IPTV Providers	171	0	18	162	0	18
Wireline Video Systems	50	0	7	40	0	7
Other	22	0	0	21	0	0
All Total	**15,099**	**32**	**168**	**14,587**	**37**	**218**

Test participants also reported the primary languages in their service area. **Table 9** tallies the five highest reported service area languages or combination of languages. Of the 13,603 responses received from EAS Participants, 12,478 reported English as the primary language in the service area, while 825 reported both English and Spanish, and 293 reported Spanish only as the primary language in the service area. As noted in **Table 9**, Korean and Chinese were the only other languages reported as the primary language in smaller numbers. No other languages were cited as a stand-alone primary language. Ten test participants cited Russian as a primary language among other primary languages. This year, 20 other languages were

reported in smaller numbers, including Vietnamese, Hindi, Hebrew, Somali, French, and Portuguese. Last year, Russian, Chinese, Korean, Samoan, Portuguese, Punjabi, Haitian, French, Armenian, Navajo, Vietnamese, Hindi, and Inupiaq/Yup'ik Eskimo were also reported in smaller numbers.

Table 9. Primary Language(s) in Service Area

English		English and Spanish		Spanish		Korean		Chinese	
#	%	#	%	#	%	#	%	#	%
12,478	91.7%	825	6.1%	293	2.2%	1	0.0%	6	0.0%

IV. ANALYSIS OF MOST SIGNIFICANT ISSUES

A. The Nationwide EAS Test: Complications

Test participants reported complications with the test that included equipment configuration issues, performance issues, audio quality issues, alerting source issues, and clock errors. As in previous years, 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 in previous nationwide EAS tests, including the 2017 nationwide EAS test and the 2018 nationwide EAS test, which included audio quality issues, equipment performance issues, software update issues, and user error.[37] Second, Form Three allowed EAS Participants to offer more detailed descriptions of the complications through the use of explanatory text fields.

1. Complications Reported in Checkboxes

Of the 20,023 test participants, 12,510 reported through checkboxes that they experienced no complications during receipt (62.5%). 13,503 (67.4%) test filers reported they experienced no complications during retransmission. **Table 10** shows the categories of complications reported by test participants through checkboxes. Test participants were asked to report whether they experienced these complications during receipt or retransmission.

Table 10. Complications Reported by Test Participants Through Checkboxes

Complication	Experienced During Receipt		Experienced During Retransmission	
	#	%	#	%
Audio Quality Issues	2219	11.1%	n/a	n/a
Equipment Configuration Issues	78	0.4%	n/a	n/a
Equipment Failure	31	0.2%	32	0.2%
Software Outdated	38	0.2%	88	0.4%
User Error	3	0.0%	8	0.0%
Other	619	3.1%	1258	6.3%

2. Complications Reported by Test Participants in Explanatory Text Fields

Table 11a categorizes the responses received in explanatory text fields for the group of 5,383 test participants that reported they experienced complications in the receipt of the test message. **Table 11b** categorizes the responses received in explanatory text fields for the group of 4,721 test participants that reported they experienced complications in retransmitting the alert.

[37] FCC, PSHSB, Report: September 27, 2017 Nationwide EAS Test at 3 (2017), https://www.fcc.gov/document/report-2017-nationwide-emergency-alert-system-test. *2018 Nationwide EAS Test Report* at 20-23.

Table 11a. Explanations Reported by Test Participants Experiencing Complications on Receipt[38]

Receipt Explanations	Number of Test Participants Reporting this Explanation	Percentage of Explanations	Percentage of All Unique Filings
Transmission Not Received	2663	49.5%	13.3%
Audio Issues	2073	38.5%	10.3%
Equipment Issues	329	6.1%	1.6%
Clock Issues	80	1.5%	0.4%
Signal Issues	63	1.2%	0.3%
Configuration Issues	56	1.0%	0.3%
Power Issues	49	0.9%	0.2%
Antenna Issues	40	0.7%	0.2%
Lightning	22	0.4%	0.1%
Internet Issues	8	0.1%	0.0%
Total	**5,383**	**99.9%**	**26.9%**

[38] Data reflected in **Tables 11a** and **11b** is based on data reported by test participants in explanatory text fields and does not correlate to the data reported by test participants through checkboxes as reported in **Table 10**. Similarly, the data reported in **Tables 11a** and **11b** is based on data reported by test participants that may not lend itself to one-to-one comparisons. Consequently, there may be variations or differences between the respective data sets.

Table 11b. Explanations Reported by Test Participants Experiencing Complications on Retransmission

Retransmission Explanations	Number of Test Participants Reporting this Explanation	Percentage of Retransmission Explanations	Percentage of All Unique Filings
Transmission Not Received	2536	53.7%	12.7%
Audio Issues	1315	27.9%	6.6%
Equipment Issues	403	8.5%	2.0%
Partial Transmission Received	119	2.5%	0.6%
Configuration Issues	95	2.0%	0.5%
Clock Issues	92	1.9%	0.5%
Power Issues	56	1.2%	0.3%
Signal Issues	46	1.0%	0.2%
Lightning	20	0.4%	0.1%
Antenna Issue	19	0.4%	0.1%
Internet Issues	9	0.2%	0.0%
Low Power	7	0.1%	0.0%
Log only[39]	4	0.1%	0.0%
Total	**4,721**	**99.9%**	**23.6%**

3. Monitoring Source Issues

2,663 test participants reported in the explanation portion of the form that they did not receive a signal from their monitored source(s). This complication reflected, by a large margin, the highest number of any category, and it represents 13.3% of all test participants.

This year, several State Emergency Communications Committees (SECCs) informed the FCC that certain areas of their state did not receive the alert. Florida, Michigan, and Georgia SECCs and other broadcasters reported PEP faults in the broadcast-based distribution system. The Bureau also received reports of smaller scale monitoring source issues (e.g., received the alert, but without audio) in parts of Wisconsin, North Dakota, Colorado, North Carolina, and New Hampshire. FEMA confirmed that there were several PEPs that did not transmit the alert due to varying degrees of equipment failures. The PEP failures were localized in a number of states and territories, including (in no particular order) Oregon, California, Pennsylvania, Maryland, Virginia, Washington, DC, Florida, Connecticut, Wisconsin, Michigan, Georgia, and American Samoa. Overall, FEMA reported that of 77 PEP stations, twelve (approximately 16%) experienced technical issues receiving and retransmitting the alert on the test day. Specifically, seven PEP stations failed to retransmit the alert. For one other station, the alert was transmitted, but due to an internal wiring issue, the PEP station did not receive the message. Lastly, four other stations retransmitted no audio and only a portion of the four-part alert (e.g., end of message and audio attention signal, or end of message and header codes).

As a practical matter, one way to reduce complications due to failure to receive the NPT from the monitored source is to ensure that there are multiple sources. Multiple monitoring sources add

[39] These filers reported to have had no duty to retransmit the alert. However, they are included in this table because they indicated a problem with retransmission. They may have filed in this category mistakenly.

redundancy to the system when one source fails and helps to maximize a test participant's ability to successfully receive and retransmit the alert. Further, we note that the Commission's rules require EAS Participants to monitor two EAS sources for EAS messages that are formatted in accordance with the EAS Protocol, in addition to requiring monitoring of IPAWS.[40] We are aware that many EAS Participants already monitor multiple broadcast-based sources. However, in light of the complications reported by many of this year's test participants, we continue to emphasize the importance of multiple monitoring sources as required by our rules.

Table 12 shows which test participants, by state, did not receive the alert and explained that this failure was due to monitoring source issues (i.e., not interference, antenna, or equipment issues). While this data does not definitively show that inability to receive a transmission was related to PEP or NP failures, it does show where there were large scale transmission failures. Notably, Florida experienced the greatest number of monitoring source failures because the contours of two PEP stations that experienced technical failures covered much of the state of Florida.[41] In fact, 60% of Florida test participants cited a range of monitoring source issues when explaining why they did not receive the alert. In Georgia, 42% of those test participants, especially the southern portion of the state, that did not receive the alert reported monitoring source problems in the explanation field of their form.[42]

[40] *See supra* note 3.

[41] FEMA has notified us that two Florida PEPs that had relay failures (WFLF(AM), Pine Hills, Florida and WOKV(AM) Jacksonville, Florida). Email from Antwane Johnson, Director, Integrated Public Alert and Warning, FEMA/NCP, to Nicole McGinnis, Deputy Bureau Chief, PSHSB, Federal Communications Commission (Mar. 16, 2020, 12:40 p.m. ET).

[42] FEMA has notified us that one Georgia PEP station (WMAC(AM), Macon, Georgia) had a relay failure. *Id.*

Table 12: Test Alert Receipt Failures Reported in Explanatory Text Fields and Sorted by State

State	Participants Noting No Test Alert Received	State	Participants Noting No Test Alert Received
FL	431	OK	23
GA	226	NE	22
WI	141	MS	18
MO	133	MN	16
CA	127	WA	16
CO	108	MA	15
PA	102	AK	13
CT	98	MD	13
MI	85	TN	13
TX	72	UT	13
NY	68	NV	10
OR	68	PR	10
IL	61	SC	10
AZ	57	ME	9
VA	56	NJ	9
NM	53	AL	8
LA	41	KS	8
MT	40	NH	8
ND	40	AS	7
NC	37	ID	7
IA	36	VT	4
WV	33	GU	2
WY	33	HI	2
AR	27	RI	2
KY	26	SD	2
OH	25	MP	1
DE	24	VI	1
IN	23		
Grand Total = 2,533			

4. Equipment Performance Issues

There were 329 test participants that reported equipment performance issues on receipt and 403 on retransmission involving non-working equipment that require sending the equipment back to the manufacturer. Participants cited that the equipment simply was out for repair, failed during the test, is missing, or malfunctioned.

5. Poor Signal

There were 63 reports of failure to receive the test message due to poor signal on receipt and 46 on retransmission. Test participants attributed the poor signal to interference, a weak signal from their monitoring source, or a weather-related complication.

6. Antenna Issues

There were 40 test participants on receipt and 19 on retransmission that reported they did not receive the test signal because the antenna failed, fell, was damaged, or was improperly positioned to receive the monitoring source.

7. Equipment Configuration

There were 56 test participants on receipt and 95 on retransmission that provided explanations of EAS equipment configuration issues. Participants in this category cited user-related configuration problems, including the system clock, incorrect tuning, and lack of software upgrades. Most test participants that reported complications related to equipment configuration also reported that they had successfully identified and corrected the cause of those complications or were fixing it immediately.

8. Audio Issues

There were 2,073 test participants on receipt and 1,315 on retransmission that explained their station did not receive the alert due to audio quality complications. Many test participants reported audio quality issues that included background noise, only tones and no message, or unintelligible audio. Some test participants attributed their audio issues to EAS equipment malfunction.

9. Accessibility Issues

Individuals with disabilities and organizations representing people with disabilities submitted observations to the FCC regarding issues relating to the accessibility of alerts. Informal feedback was also obtained from input directly emailed to the Commission. Test participants noted that the manner in which the EAS test message was displayed in some cases was not accessible to people with disabilities.[43] Specifically, test participants reported issues with the audio and the text crawls. The audio was either of poor quality or absent. The text crawls were missing, too fast and unreadable, overlapping with closed captions, or displaying poor color contrast. Although a relatively small number of test participants reported experiencing difficulties related to the accessibility of alerts (36 complaints with supporting documentation), the issues raised point out important display and audio concerns that impact the accessibility of alerts and largely mirrored those identified in the *2018 Nationwide WEA and EAS Test Report*.[44] Additionally, the Bureau has received informal feedback and anecdotal input from those referencing accessibility concerns.

[43] *See* 47 CFR § 11.51.

[44] *2018 Nationwide EAS Test Report* at 23. *See also 2017 Nationwide EAS Test Report* at 16.

V. NEXT STEPS

The Commission places the highest priority on ensuring that emergency managers have effective emergency alerting tools. In this regard, and informed by the 2018 nationwide EAS test results, the Bureau has taken steps to improve the delivery of alerts. Over the past year, for example, the Bureau conducted outreach to promote understanding and compliance with the Commission's accessibility requirements. The Bureau reminded EAS Participants of the importance of ensuring that EAS alerts are accessible to the public,[45] and added Frequently Asked Questions on EAS accessibility issues to the Bureau website.[46] To help improve EAS Participants' understanding of their role in delivering the nationwide test and to improve ETRS data, the Bureau issued both a Public Notice and distributed a targeted email to EAS Participants with guidance on how EAS Participants can improve test performance and report accurate results in ETRS.[47] Seeking to encourage improvements in the ability of low power broadcasters to successfully alert the public using EAS and increase their future participation, the Bureau organized an outreach program sending an email to all radio and television low power broadcasters with resources and an invitation to join the Bureau's educational Low Power Broadcaster Webinar. During the webinar, PSHSB staff outlined the responsibilities of EAS Participants, including low power broadcasters, and provided instructions on how to participate in the test, with a special focus on how to use the EAS Test Reporting System, and addressed commonly reported operational complications EAS Participants raised in last year's nationwide test.[48]

The Bureau will continue to take measures to improve the EAS. To help address areas for improvement highlighted by the 2019 nationwide EAS test, the Bureau should continue to conduct targeted outreach to address commonly reported operational complications and improve participation in the nationwide test. In particular, PSHSB should:

- In coordination with the FCC's Consumer and Governmental Affairs Bureau, continue to promote accessibility in the extensive outreach the Bureau conducts prior to every nationwide EAS test to ensure future EAS messages are provided with adequate audio quality, appropriate crawl speed for readability, high contrast text and background colors, and coordination of alert crawl with closed captioning.

- Continue to reach out to Low Power broadcasters through concerted outreach efforts designed to target them specifically, including using directed email campaigns, participation in trade associations and forums in which low power broadcasters are represented, and continued targeted education efforts to encourage EAS test participation, preparedness, and reporting in ETRS.

- Provide guidance, such as through Public Notices and direct follow-up with EAS Participants and SECCs, to improve the accuracy of reporting in ETRS and to address commonly reported complications. The Bureau should encourage EAS Participants to: (1) review their State EAS Plan monitoring assignments and ensure they are following them appropriately; (2) work with

---

[45] *Public Safety and Homeland Security Bureau Reminds Video Providers of Requirement to Issue Accessible EAS Alerts*, Public Notice, DA 19-648, 34 FCC Rcd 5962 (PSHSB 2019).

[46] FCC, *EAS FAQ Accessibility*, https://www.fcc.gov/eas-faq-accessibility (Oct. 29, 2019).

[47] *Public Safety and Homeland Security Bureau Provides Guidance to Improve Accuracy of Reporting for Upcoming Nationwide EAS Test,* Public Notice, DA 19-708, 34 FCC Rcd 6374 (PSHSB 2019).

[48] *See* Public Safety and Homeland Security Bureau, *Webinar For Low Power Broadcasters on The Emergency Alert System (EAS) and The EAS Test Reporting System*, https://www.fcc.gov/EAS-test-requirements-and-reporting (last visited May 4, 2020).

SECCs to ensure that their State EAS Plans are current and accurate; (3) correctly understand and identify their EAS Designation; and (4) ensure that their EAS equipment is in good working order and configured properly. In light of the data acquired in the 2019 test, the Bureau should place a special focus on encouraging EAS Participants to monitor multiple sources to ensure redundancy and reduce the possibility of message receipt failures.

- In light of the complications with monitoring assignments and test participants' apparent inaccurate EAS Designation reporting, the Bureau will engage in further analysis of the 2019 test performance to develop a more comprehensive understanding of how the alert was distributed nationally through the broadcast-based distribution system as represented by the approved State EAS Plans. If the result of this analysis could help future test performance (e.g., by informing stations that they are not a National Primary station, or if there is a gap in the state's broadcast-based distribution system), the Bureau staff will contact stations directly with this information to help them more accurately report their EAS Designation going forward.

- The Bureau will continue to consider whether improvements to ETRS can help users improve their experience and provide more guidance. For example, given test participants' confusion in identifying their EAS Designation, the Bureau could make the EAS Designation definitions more readily apparent to ETRS filers.

With respect to the single largest complication reported from the 2019 nationwide EAS test results – namely, issues with monitoring source failures – FEMA notes that it is actively taking measures to improve PEP performance going forward. In particular, FEMA has begun working with SECCs in several states to conduct state-level tests on a monthly basis and station-level tests on a weekly basis through the PEP stations. FEMA emphasizes that continued testing of the PEP stations will improve EAS performance over time, as this testing will help ensure the PEP stations are relaying messages properly through the EAS and allow stakeholders to make ongoing improvements and adjustments as needed. In this regard, closer monitoring of EAS equipment and its configuration to ensure it is functioning properly should be implemented through the course of these over-the-air tests. PEP stations should take all necessary steps to ensure any EAS equipment demonstrated to be defective or erratic is replaced. In addition, FEMA and a number of EAS Participants have conducted a review of certain PEP station switching and relay processes. Where this review has identified difficulties with switching and audio routing issues, FEMA has proposed resolutions to correct the problems. To ensure more accurate origination of national messages, FEMA intends to review and update its alert origination procedures, as well as conduct additional testing. FEMA further recommends that EAS test participants encourage their staff to continue educational, skills, and trouble-shooting training.

VI. CONCLUSION

The 2019 nationwide EAS test was successful in that it demonstrated that the nationwide broadcast-based EAS distribution system would largely perform as designed, if activated without the availability of the Internet. At the same time, the test exposed several deficiencies within the system that require improvement. Some areas of deficiency stem from matters within the control of the EAS Participants themselves and can be redressed with better education, continued training, and improved communication as described above. At the same time, we recognize that it is difficult to achieve 100% assurance that all components in the chain will function properly in the future. For example, it is difficult to anticipate when technical problems with EAS Participants' equipment will arise, or where an unforeseen weather complication can negatively affect the reception and relay of a message. As noted above, however, continued and regular testing of the system will help ensure that any needed improvements and adjustments are made to address those circumstances that can be identified in advance, and that EAS

equipment is in reliable working order. The Bureau will continue to work with FEMA, EAS Participants, and other EAS stakeholders to improve the system and ensure that the EAS remains effective and can transmit timely and accurate national alerts to the public when they are needed the most.

APPENDIX: HOW EAS WORKS

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.[49] 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.[50] The FCC, in conjunction with FEMA and the NWS, implements EAS at the federal level.[51] The respective roles these agencies play are defined by a 1981 Memorandum of Understanding between FEMA, NWS and the FCC;[52] a 1984 Executive Order;[53] a 1995 Presidential Statement of EAS Requirements;[54] and a 2006 Public Alert and Warning System Executive Order.[55] 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.s

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.[56] 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 transmit alerts with prerecorded messages that can be delivered at the discretion of the EAS Participant, rendering non-

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

[50] 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.

[51] 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)*.

[52] *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.

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

[54] *See 1995 Presidential Statement*.

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

[56] *See* 47 CFR Part 11.

Presidential alerts (and their related testing procedures) inappropriate for end-to-end testing of a national alert.[57]

Broadcast-Based Distribution of EAS

There are two methods by which EAS alerts may be distributed. Under the broadcast-based distribution structure, illustrated in Figure 2 below, the EAS is designed to cascade the EAN through a pre-established hierarchy of broadcast, cable, and satellite systems. FEMA initiates a nationwide, Presidential alert using specific encoding equipment to send the EAN code initially to the Primary Entry Point (PEP) stations over a secure telephone (wireline) connection.[58] PEP stations are privately owned commercial and non-commercial radio broadcast stations that cooperatively participate with FEMA to provide emergency alert and warning information to the public before, during, and after a national or local emergency.[59] 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, in turn, open up an audio channel to FEMA via the PEP, and broadcast the EAN in their listening areas. The remaining broadcasters, cable television facilities and other EAS Participants located in each LP's broadcast

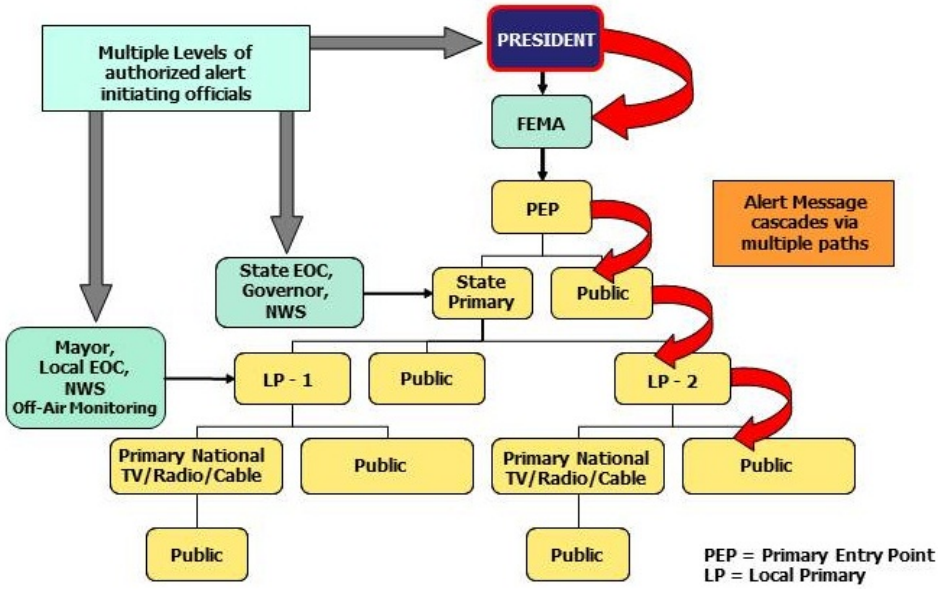
[57] *See 2011 EAS Nationwide Test Report* at 7, n.13.

[58] 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.

[59] *See* FEMA Fact Sheet, Primary Entry Point (PEP) Stations *available at:* https://www.fema.gov/media-library-data/1409162590527-dc7e1a0996109d271cac4b712e201903/PEP%20Station%20Fact%20Sheet_20140730_508.pdf (last visited May 4, 2020); *see also* information about PEP stations at https://www.fema.gov/national-public-warning-system (last visited May 4, 2020). PEP stations serve as the primary source of initial broadcast for a national alert and are equipped with back-up communications equipment and power generators designed to enable them to continue broadcasting information to the public during and after an event. *Id.*

footprint receive the alerts from the LP stations, transmit the alerts to the public (or in the case of cable, to customers' set top boxes), and open up the audio channel to FEMA through their PEP and LP.

Figure 2. EAS Architecture



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.[60] As of June 30, 2012, EAS Participants are required to be able to receive EAS alerts formatted in Common Alerting Protocol (CAP)[61] 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).[62] An EAS Participant that receives a CAP-formatted message can utilize the CAP-formatted content to generate

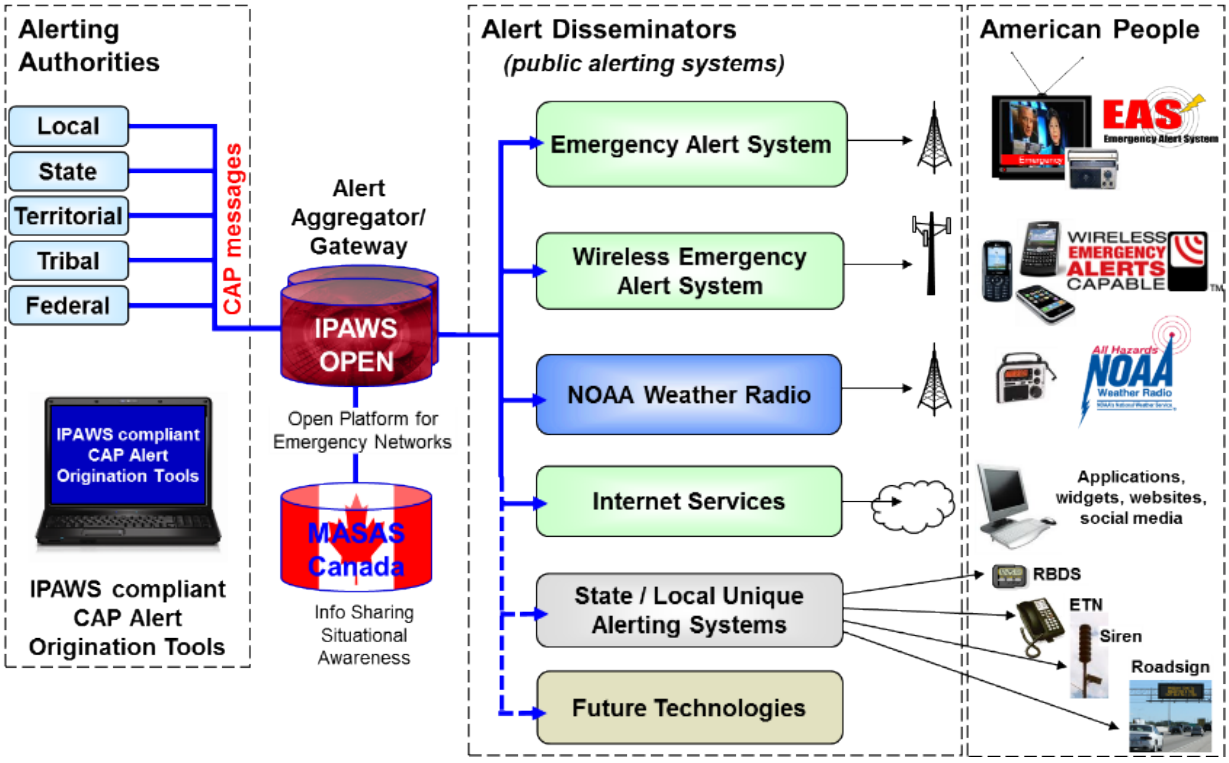
[60] FEMA, Integrated Public Alert & Warning System, https://www.fema.gov/integrated-public-alert-warning-system (last visited May 4, 2020).

[61] *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.*

[62] *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 broadcast-based distribution system, as reflected in the part 11 rules. *See e.g.*, 47 CFR § 11.51(d), (g)(3), (h)(3), (j)(2).

messages in synchronous audio and visual formats, which then can be broadcast to local viewers and listeners.[63] 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.[64]

Figure 3. IPAWS Architecture



[63] *See* 47 CFR § 11.51(d), (g)(3), (j)(2).

[64] *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 May 4, 2020).