

AM Broadcast Radio in Motor Vehicles

December 19, 2024

Congressional Research Service

<https://crsreports.congress.gov>

R48315



R48315

December 19, 2024

Dana A. Scherer
Specialist in
Telecommunications
Policy

AM Broadcast Radio in Motor Vehicles

More than 4,000 U.S. broadcast radio stations use amplitude modulation (AM) frequencies—a technology more than 100 years old—to transmit audio programming containing news, music, and information to listeners. AM radio also supports national and local emergency alerting systems. Since 2014, several motor vehicle manufacturers have opted not to include broadcast AM radio in electric vehicles (EVs).

Because motor vehicles are the most popular location for people to listen to radio, losing access in vehicles poses an economic threat to broadcast radio stations. Broadcast radio stations generate most of their revenue from advertisers seeking to reach the stations' listeners. In addition to excluding AM broadcast radio, some original equipment manufacturers (OEMs) have opted to exclude equipment designed to receive satellite transmission from the 20-year-old radio service Sirius XM, which, similarly to broadcast radio stations, has also relied on access to drivers and passengers to generate revenue. In addition, the emergence of the infotainment interfaces from Apple Inc. (CarPlay) and Alphabet Inc. (Android Auto), which enable drivers to access audio news and entertainment via applications (apps), has led OEMs to claim that listeners do not need broadcast receivers to listen to programming from AM stations that simulcast via mobile apps.

Several EV manufacturers assert that their vehicle models' electronic equipment interferes with the reception of AM broadcast signals, thereby obstructing the consumer benefits of AM broadcast receivers. The Federal Communications Commission (FCC) has statutory jurisdiction over electronic equipment that can interfere with broadcast reception. In 1980, the agency chose to exempt motor vehicle equipment from its licensing requirements, stating that including it would require further study. The exemption remains in place. The U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA) establishes safety standards for, but does not preapprove, electronic equipment in vehicles,

Broadcasters and seven former administrators of the Federal Emergency Management Agency state that the lack of access to broadcast transmissions from AM radio stations could impede the ability of drivers and passengers to receive national and local emergency alerts. AM radio stations serve two roles during emergency alerts: (1) they are initial points of contact for presidential and nonpresidential emergency alerts in the broadcast-based transmission system regulated by FCC, and (2) they provide one of several technology-based communications pathways for nonpresidential emergency alerts. Other pathways include communication by satellite transmissions and wireless transmission using cellular technology.

If Congress chooses to address the issue of the availability of AM radio in motor vehicles, it may consider one or more options, some of which are included in bills introduced in the 118th Congress. These options include (1) increasing NHTSA's and FCC's jurisdiction over motor vehicle equipment, (2) studying the role of and considering alternatives to AM radio in the transmission of national and emergency alerts, and (3) monitoring industry developments while conducting oversight.

Contents

Introduction	1
Audio Entertainment in Motor Vehicles	2
Broadcast Radio	2
SiriusXM	3
Apple CarPlay and Android Auto	4
Electric Vehicles and AM Radios	4
Federal Jurisdiction Over Electromagnetic Interference	5
National Highway Traffic Safety Administration	5
Federal Communications Commission	6
Oversight of Broadcast Radio Stations	6
Oversight of Electronic Devices	7
Transmission of Presidential and Emergency Alerts	7
National Emergency Message (Presidential Alert) System	8
Nonpresidential Federal, State, Tribal, and Local Alerts	8
Role of AM Radio Stations	9
Options for Congress	9
Increase Federal Jurisdiction Over Motor Vehicle Equipment	10
Direct Government Agencies to Issue Studies, Reports	10
Monitor the Private Sector	11

Contacts

Author Information	11
--------------------------	----

Introduction

Broadcast radio—a technology over 100 years old¹—is a system of communicating by transmitting soundwaves using the radiofrequency portion of the electromagnetic spectrum.² In addition to being used in radio broadcasting, radio waves are used to transmit information for wireless internet, telecommunications, and navigation systems.³

The oldest form of commercial broadcast radio—broadcast radio programming interspersed with advertising⁴—is amplitude modulation (AM) radio.⁵ The term *modulation* refers to the process of varying some characteristic of the electrical carrier when transmitting the soundwaves.⁶ With AM radio, the *amplitude*, or overall strength of a signal, is varied to encode sound information.⁷ As of September 2024, 4,400 AM radio stations operate in the United States.⁸

Due to their technical characteristics, AM radio broadcasts are more susceptible than frequency modulation (FM)⁹ radio broadcasts to interference from electronic devices, vehicle engines, power lines, phone chargers, light bulbs, computer monitors, and flat-screen television.¹⁰ During the last 10 years, several motor vehicle manufacturers, known as “original equipment manufacturers” (OEMs),¹¹ have opted not to include broadcast AM radio in battery-powered electric vehicles (EVs).¹² The OEMs claim that EVs’ in-vehicle systems interfere with AM radio station signals. In addition, the OEMs maintain listeners can receive the same programming via applications (apps) and mobile wireless communications.

In addition to providing news, information, music, and entertainment programming, AM radio stations serve two roles in the transmission of national presidential and local emergency alerts. AM stations are (1) the initial points of contact for messages from national and local offices that

¹ Federal Communications Commission (FCC), “History of Commercial Radio: Celebrating 100 Years of Commercial Radio,” <https://www.fcc.gov/media/radio/history-of-commercial-radio>. FCC defines an *AM broadcast station* as “a broadcast station licensed for the dissemination of radio communications intended to be received by the public and operated on a channel in the band of frequencies extending from 535 to 1705 kHz.” 47 C.F.R. §74.14.

² Harry Newton (with Steve Schoen), *Newton’s Telecom Dictionary*, 30th ed. (Baltimore: United Book Press, 2016), p. 1037 (defining *radio*) (hereinafter Newton, *Newton’s Telecom Dictionary*, 2016).

³ *Ibid.*

⁴ FCC, Media Bureau, Video Division, “The Public and Broadcasting, The Licensing of TV and Radio Stations, Commercial and Noncommercial Educational Stations,” revised September 2021, <https://www.fcc.gov/media/radio/public-and-broadcasting#NCECOMM>.

⁵ FCC, “AM Radio,” <https://www.fcc.gov/general/am-radio/>.

⁶ Newton, *Newton’s Telecom Dictionary*, 2016, p. 759.

⁷ Public Broadcasting System, WGBH, “Radio Transmission: FM vs. AM: What’s the Difference?,” <https://www.pbs.org/wgbh/aso/tryit/radio/radiorelayer.html>. FCC, “FM Radio,” <https://www.fcc.gov/general/fm-radio>.

⁸ FCC, “Broadcast Station Totals as of September 30, 2024,” October 7, 2024, <https://docs.fcc.gov/public/attachments/DA-24-1034A1.pdf>.

⁹ FCC, “FM Radio,” <https://www.fcc.gov/general/fm-radio>.

¹⁰ FCC, “Revitalization of the AM Radio Service, Notice of Proposed Rulemaking, FCC 13-139,” 28 *FCC Record* 15221, 15223 (hereinafter 2013 FCC AM Radio NPRM). See also Newton, *Newton’s Telecom Dictionary*, 2016, p. 514.

¹¹ Garrett Nelson and Xiong Jun Goon, “Automobile Manufacturers,” CFRA, *Industry Surveys*, November 2024, p. 10.

¹² Joey Caparella, “Electric Cars vs. Gas Cars: Everything You Need to Know,” *Car & Driver*, August 8, 2022, <https://www.caranddriver.com/research/a32781943/electric-cars-vs-gas-cars/>.

are retransmitted to other electronic media and (2) the foundations of backup communications systems for wireless and internet services in the event natural disasters disrupt them.¹³

Citing a national interest in ensuring motorists can receive emergency alerts via AM broadcast stations, some Members of the 118th Congress have introduced bills that would require OEMs to include broadcast AM radio receivers in future motor vehicles made and sold in the United States.

This report provides background information and analysis of the technological, public safety, economic, and jurisdictional issues related to the availability of broadcast AM radio receivers in motor vehicles. For context, this report begins with a description of the developments in the broadcast radio and motor vehicle industries that affect broadcasters' and OEMs' positions regarding these issues.

Audio Entertainment in Motor Vehicles

In its 2022 *Communications Marketplace Report*, the Federal Communications Commission (FCC) stated that, for several decades, broadcast radio offered advertisers a unique opportunity to reach listeners in vehicles.¹⁴ In the 21st century, other in-vehicle audio entertainment options—specifically satellite digital audio radio services (SDARS) and apps accessible through consumers' smartphones—began to emerge, creating competition for broadcast radio. Between 1998 and 2023, broadcast radio station industry revenue, when adjusted for inflation, declined. The drop in revenue coincided with both the nationwide decline in advertising spending during economic recessions,¹⁵ as well as the emergence of competition for audience attention and advertising dollars from SiriusXM and apps available via Apple CarPlay and Android Auto.

Broadcast Radio

Broadcast radio stations depend on advertising revenue derived from their ability to reach listeners broadly. In the 20th century, technological developments and consumer demand led OEMs to install radios as standard equipment in most motor vehicle models. By the mid-1970s, 90% of motor vehicles had radios.¹⁶ Of the 100 top-selling newly manufactured motor vehicles surveyed between November 2023 and January 2024, 98% reportedly included AM radio receivers.¹⁷ Another consumer survey reported that vehicles were the number one listening

¹³ The Integrated Public Alert and Warning System Modernization Act of 2015 (P.L. 114-143) directed the Federal Emergency Management Agency (FEMA)—a component of the U.S. Department of Homeland Security (DHS)—to, among other actions, (1) establish common alerting and warning protocols, standards, terminology, and operating procedures for a public alert and warning system; and (2) include in such system the capability to adapt the distribution and content of communications on the basis of geographic location, risks, and multiple communication technologies. FEMA describes the multiple communication pathways on its website. DHS, FEMA, "Integrated Public Alert and Warning System," <https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system>.

¹⁴ FCC, 2022 *Communications Marketplace Report*, Report no. FCC 22-2103, December 30, 2022 (hereinafter 2022 FCC Report).

¹⁵ Alvin J. Silk and Ernst R. Berndt, "Aggregate Advertising Expenditure in the U.S. Economy: Measurement Growth Issues in the Digital Era," *Foundations and Trends in Marketing*, vol. 15, no. 1 (September 2021), p. 7. (Finding evidence that during the period 2000-2008, "nominal aggregate advertising spending had become more responsive to changes in real [gross domestic product (GDP)] and GDP inflation.")

¹⁶ Rob Siegel, "History of Obsolete Car Audio, Part 1, Early Radio," *Automotive History* (blog), The Hagerty Group, Inc., December 11, 2017, <https://www.hagerty.com/media/automotive-history/history-of-early-radio/>.

¹⁷ Quu, 2024 *In-Vehicle Visuals Report: Radio's Place in America's Top-Selling New Vehicles*, April 2024, p. 8, https://myquu.net/wp-content/uploads/2024/04/Quu_2024-In-Vehicle-Visuals-Report.pdf.

location for over-the-air radio station content as of 2023,¹⁸ representing a 39% share of total listening modes.¹⁹ Broadcast radio's share relative to other listening modes has declined since 2013, when the share was 58%.²⁰

SiriusXM

The subscription satellite radio services XM and Sirius launched in September 2001 and February 2002, respectively.²¹ These services are known as Satellite Digital Audio Radio Services (SDARS).²² In the 10 years following the companies' launch dates, an increasing number of new U.S. motor vehicles included SDARS.²³ By 2024, SDARS receivers were factory-installed in nearly 80% of all new vehicles sold in the United States.²⁴

Some EV manufacturers have opted to forego factory installation of satellite receivers. At a March 2024 investor conference, SiriusXM CEO Jennifer C. Witz stated the company's "penetration rates among EVs manufactured by ... the more traditional OEMs are very strong," and that its exclusion from several models manufactured by Tesla—which only makes EVs—"is the big gap there."²⁵

¹⁸ The results from the 2023 report are based on a survey of 30,011 respondents within the United States and Canada. For more on the methodology, see Jacobs Media, *TechSurvey 2023 Results: Radio in the Post-Pandemic Era* (slide deck), 2023, p.2, <https://jacobsmedia.com/techsurvey-2023/>.

¹⁹ Fred Jacobs, "When It Comes to AM/FM Radio, 'Try a Little Tenderness,'" *JacoBlog* (blog), Jacobs Media, December 11, 2023, <https://jacobsmedia.com/when-it-comes-to-am-fm-radio-try-a-little-tenderness/>.

²⁰ Clyde Smith, "Jacob Media's Tech Survey Shows Annual Slip for AM/FM Radio and TV," *Hypebot*, June 17, 2013, <https://www.hypebot.com/hypebot/2013/06/jacobs-medias-techsurvey9-reveals-annual-slip-for-both-amfm-radio-and-tv-infographic.html>.

²¹ "C-SPAN, Satellite Radio Launch," *C-SPAN*, September 25, 2001, <https://www.c-span.org/video/?166288-1/satellite-radio-launch>; and Brian Santo, "The Consumer Electronics Hall of Fame: SiriusXM Satellite Radio System," *IEEE Spectrum*, October 31, 2019, <https://spectrum.ieee.org/the-consumer-electronics-hall-of-fame-siriusxm-satellite-radio-system>.

²² FCC defines *SDARS* as "radiocommunication service[s] in which audio programming is digitally transmitted by one or more space stations directly to fixed, mobile, and/or portable stations, and which may involve complementary repeating terrestrial transmitters and telemetry, tracking and command facilities." 47 C.F.R. §25.103.

²³ SiriusXM Radio, "Sirius XM Radios Factory Installed in More Than 50 Million Vehicles," press release, August 22, 2012, <https://investor.siriusxm.com/news-events/press-releases/detail/221/siriusxm-radios-factory-installed-in-more-than-50-million> (hereinafter SiriusXM 2012 press release). Sirius and XM merged in July 2008. SiriusXM Radio, "Sirius and XM Complete Merger," press release, July 29, 2008, http://s1.q4cdn.com/750174072/files/doc_news/SIRIUS-AND-XM-Complete-Merger07292008.pdf.

²⁴ SiriusXM 2012 press release; and Sirius XM Holdings, Inc., *Transcript of Liberty Media Corporation and Sirius XM Holdings Inc. Joint Investor Call Held on December 12, 2023*, p. 1, <https://investor.siriusxm.com/sec-filings/all-sec-filings/content/0000930413-23-002607/0000930413-23-002607.pdf> (hereinafter Sirius XM December 2023 Investor Call).

²⁵ "Sirius XM Holdings, Inc. Presents at Morgan Stanley's Technology, Media & Telecom Conference 2024," San Francisco, CA, March 6, 2024, p. 9 (accessed via *S&P Global Market Intelligence* subscription database).

Apple CarPlay and Android Auto

In March 2014, Apple Inc. launched Apple CarPlay,²⁶ an infotainment system software interface that enables drivers and riders to access their mobile phone apps on their vehicle dashboards.²⁷ In May 2015, Google launched Android Auto, a competitor to Apple CarPlay.²⁸ A research firm reported that as of September 2023, 98% of new motor vehicles worldwide supported either Apple CarPlay or Android Auto.²⁹

Electric Vehicles and AM Radios

In 1997, Toyota launched the Prius—the first mass-produced hybrid EV on the global market.³⁰ Over the next several years, other OEMs also launched EVs. In August 2014, BMW disclosed that it would not include radios capable of tuning into AM radio stations in its i3 and i8 EV models.³¹ In December 2022, in response to an inquiry from Senator Edward J. Markey to 20 OEMs about policies regarding the inclusion of AM radio,³² BMW stated the following, citing electromagnetic interference (EMI) as one concern:

BMW made the decision to not include analog AM radio broadcasting in its EV and [Plug-in Hybrid Electric Vehicle (PHEV)] models beginning with the BMW i3 [sic] in 2014 primarily for two reasons: 1) electromagnetic interference [EMI] creates poor analog AM radio reception quality and 2) technological innovation has afforded consumers many additional options to receive the same or similar information.³³

²⁶ The term *automotive infotainment* refers to an in-vehicle system that combines entertainment such as radio and music playing with driving information such as navigation, advanced driver assistant systems, and vehicle settings. Infotainment systems fundamentally rely on software rather than hardware. Rather than include multiple disparate pieces of hardware from different manufacturers, infotainment systems use one central hardware platform. The platform receives input from multiple sources within the vehicle, including sensors, global positioning systems, and cameras, combined with the software used to provide entertainment services. BlackBerry QNX, “Ultimate Guides: What is Automotive Infotainment?,” <https://blackberry.qnx.com/en/ultimate-guides/software-defined-vehicle/infotainment#what-is-it>.

²⁷ Apple Inc., “Apple Rolls Out CarPlay Giving Drivers a Smarter, Safer & More Fun Way to Use iPhone in the Car,” press release, March 3, 2014, <https://www.apple.com/newsroom/2014/03/03Apple-Rolls-Out-CarPlay-Giving-Drivers-a-Smarter-Safer-More-Fun-Way-to-Use-iPhone-in-the-Car/>.

²⁸ Hyundai Auto America, “Hyundai is the First Automaker to Launch Android Auto,” press release, May 26, 2015, <https://www.prnewswire.com/news-releases/hyundai-is-the-first-automaker-to-launch-android-auto-300088182.html>.

²⁹ Straits Research, “Infotainment Takeover: 98% of New Cars Demand CarPlay and Android Auto While Distracted Driving Takes a Toll,” *Statistics* (blog), September 15, 2023, <https://straitsresearch.com/statistic/in-vehicle-infotainment-system>.

³⁰ Rebecca Matulka, “The History of the Electric Car,” *Articles* (blog), U.S. Department of Energy, September 15, 2014, <https://www.energy.gov/articles/history-electric-car> (hereinafter Matulka, DOE blog, September 2014).

³¹ Leslie Stimson, “Second BMW Model Lacks AM,” *Radio World*, August 21, 2014, <https://www.radioworld.com/news-and-business/second-bmw-model-lacks-am>.

³² Sen. Edward J. Markey, “Senator Markey Urges Automakers to Maintain Free Broadcast Radio in Future EV Models,” press release, December 1, 2022, <https://www.markey.senate.gov/news/press-releases/senator-markey-urges-automakers-to-maintain-free-broadcast-radio-in-future-ev-models>.

³³ The term electromagnetic interference (EMI) refers to any “unwanted” electromagnetic field that can disrupt the operation of an electronic circuit. Avnet Staff, “Understand the Sources of Electromagnetic Interference in Electric Vehicles,” Avnet Articles (blog), April 24, 2023, <https://www.avnet.com/wps/portal/us/resources/article/understand-the-sources-of-electromagnetic-interference-in-electric-vehicles/?srsltid=AfmBOooI7PCWNJOrUTOnoV7pZH5-qt8XYjjJKsXwlykJSiL0pYhXY4r>. Letter from Adam McNeill, vice president of Engineering, BMW of North America, LLC, BMW Group Company, to Sen. Edward J. Markey, December 20, 2022, pp. 23–24, https://www.markey.senate.gov/imo/media/doc/letters_of_automaker_responses_-_030823pdf.pdf.

Several other OEMs—Jaguar Land Rover, Mazda, Rivian, Stellantis, Tesla, Toyota, Volkswagen, and Volvo—have expressed their agreement with BMW’s view that the technology used in their EV models can interfere with AM broadcast station signals.³⁴ In contrast, the OEM Kia stated in its December 2022 response to Senator Edward J. Markey’s letter, “we are not aware of any issues with [EMI] with AM signals from our EVs.”³⁵

Eight OEMs—BMW, Ford, Mazda, Polestar, Rivian, Tesla, Volkswagen, and Volvo—said they had removed broadcast AM receivers from one or more EV models.³⁶ Ford reversed its decision in May 2023.³⁷

In October 2023, the Center for Automotive Research released a study commissioned by the Alliance for Automotive Innovation, a trade organization representing OEMs. The study found that the cost of EMI mitigation “depends upon the electrical architecture of the vehicle and entails several design and engineering tradeoffs.”³⁸ The National Association of Broadcasters (NAB)—a trade organization representing broadcast station owners—countered that OEMs could combat interference with AM broadcast reception with a “simple software upgrade” or other “nascent technologies.”³⁹

Federal Jurisdiction Over Electromagnetic Interference

National Highway Traffic Safety Administration

The U.S. Department of Transportation’s National Highway Traffic Safety Administration (NHTSA) regulates the safety of motor vehicles and related equipment. Congress requires vehicle and equipment manufacturers to comply with NHTSA’s vehicle safety standards in order to sell vehicles in the United States. OEMs must self-certify to motor vehicle distributors or dealers that they comply with the standards.⁴⁰ The National Traffic Motor Vehicle and Safety Act of 1966 (P.L. 89-563) authorizes NHTSA to require recalls of vehicles that do not meet federal standards for safety.⁴¹ NHTSA has four primary tools to address the introduction of new technologies and

³⁴ See “Responses from automakers” link in Sen. Edward J. Markey, “Senator Markey Criticizes Eight Automakers for Removing Broadcast AM Radio from Vehicles,” press release, March 3, 2023, <https://www.markey.senate.gov/news/press-releases/senator-markey-criticizes-eight-automakers-for-removing-broadcast-am-radio-from-vehicles>.

³⁵ Letter from Christopher Wenk, vice president of Government Affairs, Kia Corp., to Sen. Edward J. Markey, December 22, 2022, p. 32, https://www.markey.senate.gov/imo/media/doc/letters_of_automaker_responses_-_030823pdf.pdf.

³⁶ Sen. Edward J. Markey, “Senator Markey Criticizes Eight Automakers for Removing Broadcast AM Radio from Vehicles,” press release, March 8, 2023, <https://www.markey.senate.gov/news/press-releases/senator-markey-criticizes-eight-automakers-for-removing-broadcast-am-radio-from-vehicles>.

³⁷ Jim Farley (@jimfarley98), “After speaking with policy leaders about the importance of AM broadcast radio,” X post, May 23, 2023, <https://x.com/jimfarley98/status/1661024295110463491>.

³⁸ Snehasis Ganguly et al., *Analog AM Band Interference in Electric Vehicles: Technical Solutions & Cost of Mitigating Electromagnetic Interference*, Center for Automotive Research, October 2023, p. 1, <https://www.cargroup.org/wp-content/uploads/2023/11/AM-Radio-RFI-Technical-Report.pdf>.

³⁹ Curtis LeGeyt, “Preserving AM Radio in Cars Keeps Americans Safe,” *Advocacy: Localism* (blog), National Association of Broadcasters, March 8, 2023, <https://www.blog.nab.org/2023/03/08/preserving-am-radio-in-cars-keeps-americans-safe/>.

⁴⁰ 49 U.S.C. §30115. See U.S. Department of Transportation (DOT), National Highway Traffic Safety Administration (NHTSA), “Laws and Equipment,” <https://www.nhtsa.gov/laws-regulations>.

⁴¹ 49 U.S.C. §30120.

approaches to existing technologies: (1) letters of interpretation, (2) exemptions from existing standards, (3) rulemakings to amend existing standards or create new standards, and (4) enforcement authority to address noncompliance with its standards.⁴²

In its 2015 report to Congress, *Electronic Systems Performance in Passenger Motor Vehicles*, NHTSA stated that OEMs often test their platforms in accordance with the international standard-setting organizations SAE International and the International Organization for Standardization.⁴³ NHTSA added that “collaborating with industry, standards-development organizations, and academia to develop standards that ensure the safety and security of automotive electronic systems” is “important[t].”⁴⁴ In May 2024, pursuant to NHTSA’s authority to enforce safety standards, Ford recalled more than 109,000 Lincoln Aviator vehicles due to potential EMI with backup camera functions caused by consumer mobile phones.⁴⁵

Federal Communications Commission

FCC has general jurisdiction over broadcast radio stations and electronic-electrical products (devices) capable of emitting radiofrequency (RF) energy that could interfere with broadcast radio stations’ signals, with some exceptions. Among the RF-emitting devices exempt from FCC jurisdiction are digital devices used exclusively in transportation vehicles, including in motor vehicles.

Oversight of Broadcast Radio Stations

FCC’s Media Bureau allocates spectrum it has designated for the use of broadcasting.⁴⁶ The bureau grants licenses to broadcast radio station owners for eight-year terms,⁴⁷ provided FCC determines “the public interest, convenience, and necessity”⁴⁸ will be served by the license. FCC is authorized to make determinations on radio licenses, frequencies, hours of operation, and power pursuant to Section 307 of the Communications Act of 1934.⁴⁹

Due to the physical properties of AM radio waves, AM station broadcasts are susceptible to electromagnetic interference from broadcast stations.⁵⁰ To mitigate interference between AM

⁴² Ibid.

⁴³ The organization known as the Society of Automotive Engineers until 2006 is an international association of more than 128,000 engineers and related technical experts in the aerospace, automotive, and commercial vehicle industries. SAE International, “About, Overview,” <https://www.sae.org/about>. See also SAE International, “2023 Reflections: It’s Actually Just ‘SAE,’” *SAE Blog*, December 21, 2023, <https://www.sae.org/blog/its-actually-just-sae-international>. The International Organization for Standardization (ISO) is an international nongovernmental organization made up of national standards bodies from 172 countries that develop and publish a wide range of proprietary, industrial, and commercial standards. ISO, “About ISO: What We Do,” <https://www.iso.org/what-we-do.html>.

⁴⁴ DOT, NHTSA, *Electronic Systems Performance in Passenger Motor Vehicles*, December 2015, p. 27, https://www.nhtsa.gov/sites/nhtsa.gov/files/2023-05/Electronic-Systems-Performance_1-20-16-tag.pdf. (hereinafter 2015 NHTSA Report). NHTSA published the report in response to a directive in §31402 of the Moving Ahead for Progress in the 21st Century Act (P.L. 112-141) that the Secretary of Transportation “complete an examination of the need for safety standards with regard to electronic systems in passenger motor vehicles.”

⁴⁵ DOT, NHTSA, “Part 573 Safety Recall Report: Ford Motor Company,” May 23, 2024, <https://static.nhtsa.gov/odi/rcr/2024/RCLRPT-24V368-8061.PDF>.

⁴⁶ FCC, “Media, About the Bureau,” <https://www.fcc.gov/media>.

⁴⁷ Communications Act of 1934, as amended, §307(c)(1) (47 U.S.C. §307(c)(1)).

⁴⁸ Communications Act of 1934, as amended, §307(a) (47 U.S.C. §307(a)).

⁴⁹ 47 U.S.C. §307.

⁵⁰ FCC, “Revitalization of the AM Radio Service, Notice of Proposed Rulemaking, FCC 13-139,” 28 *FCC Record* (continued...)

broadcast stations, FCC requires most AM stations to reduce power or cease operation at night to protect the signals of certain other AM stations that operate in frequencies known as “clear channels” 24 hours per day.⁵¹

Oversight of Electronic Devices

Broadcast radio stations are susceptible to interference from consumer electronic devices.⁵² To mitigate such interference, Section 302a of the Communications Act of 1934, as amended, gives FCC oversight over these devices and other electronic equipment.⁵³

The agency’s Office of Engineering and Technology authorizes and licenses devices, transmitters, and facilities that generate RF radiation.⁵⁴ In contrast to NHTSA—which establishes safety standards for, but does not preapprove, electronic equipment in vehicles—FCC tests electronic equipment to ensure the equipment does not interfere with broadcast signals. Generally, manufacturers must obtain authorizations from FCC before they sell electronic equipment.

Manufacturers of certain types of equipment, including “digital devices used exclusively in any transportation vehicle, including motor vehicles,”⁵⁵ need not obtain an FCC authorization prior to selling that equipment.⁵⁶ Manufacturers of this type of equipment must comply with FCC’s rules for general conditions of operations. Under these rules, if an FCC representative notifies an operator that an electronic piece of equipment is interfering with broadcast services, then the manufacturer must fix the interference issue.⁵⁷

Transmission of Presidential and Emergency Alerts

In February 2023, seven former FEMA administrators wrote a letter to the Secretary of Transportation requesting that he “secure assurances from automakers” that they “[maintain] AM radios in their vehicles.”⁵⁸ The administrators stated that the absence of AM broadcast radio reception in motor vehicles could interfere with FEMA’s ability to comply with federal laws. According to FEMA, “In many cases, radio and TV stations continue to operate when other means of alerting the public are unavailable, providing a layer of resiliency to the suite of

15221, 15223 (hereinafter 2013 FCC AM Radio NPRM). In 2018, FCC sought comments on proposed rule changes that would reduce nighttime protection for wide-area coverage Class A AM broadcast stations and enable more AM stations to increase their nighttime service. FCC, “Revitalization of the AM Radio Service, FCC 18-139, Second Further Notice of Proposed Rulemaking,” 33 *FCC Record* 9946, October 5, 2018. As of 2024, this proceeding remains open. FCC, “EDOCS Search Results, RM 13-249, FCC only,” <https://www.fcc.gov/edocs/search-results?t=advanced&dockets=13-249&fccda=fcc>.

⁵¹ FCC, Media Bureau, Audio Division, AM Radio, “Why AMs Reduce Power/Cease Operations at Night,” December 11, 2015, <https://www.fcc.gov/media/radio/am-stations-at-night>.

⁵² FCC, Office of Engineering and Technology, Laboratory Division, “Equipment Authorization – RF Device,” <https://www.fcc.gov/oet/ea/rfdevice>.

⁵³ 47 U.S.C §302a. This section became effective in 1968 with the enactment of P.L. 90-379, “An Act to amend the Communications Act of 1934, as amended, to give the Federal Communications authority to prescribe regulations for the manufacture, import, sale, shipment, or use of devices which cause harmful interference to radio reception.”

⁵⁴ 47 C.F.R. §15.

⁵⁵ The term *digital device* is defined at 47 C.F.R. §15.3(k).

⁵⁶ 47 C.F.R. §15.103.

⁵⁷ 47 C.F.R. §15.5.

⁵⁸ Letter from James Lee Witt, former FEMA administrator et al., to Secretary Pete Buttigieg, DOT, February 26, 2023, <https://www.radioworld.com/wp-content/uploads/2023/02/radios-in-cars-letter-to-Sec-Buttigieg-sent.pdf> (hereinafter February 2023 letter from former FEMA administrators to DOT).

available emergency communication tools.”⁵⁹ The following describes the role of AM radio stations in transmitting presidential alerts and nonpresidential federal, state, tribal, and local alerts.

National Emergency Message (Presidential Alert) System

Section 706(c) of the Communications Act of 1934, as amended (47 U.S.C. §606(c)), grants specific, communications-related powers to the President when the President issues a proclamation stating that a war or national emergency exists.⁶⁰

The Emergency Alert System (EAS) is a national alert and warning system that exists primarily to enable the President to issue warnings to the U.S. public during emergencies via broadcast radio receivers, satellite radio receivers, and television sets.⁶¹ FCC requires EAS participants to have the capacity to receive and transmit a National Emergency Message, formerly known as a “presidential alert,” disseminated over the EAS.⁶²

Nonpresidential Federal, State, Tribal, and Local Alerts

EAS participants voluntarily transmit thousands of alerts and warnings issued annually by the U.S. Department of Commerce’s National Weather Service (NWS)⁶³ and state, tribal, and local governments.⁶⁴ These alerts typically address severe weather threats, child abductions, and other local emergencies.

FEMA acts as an executive agent for the development, operation, and maintenance of the national-level EAS.⁶⁵ The agency established the Integrated Public Alert and Warning System (IPAWS) in 2006 to integrate EAS and other public alert systems into a larger, more comprehensive public alert system, in response to Executive Order 13407.⁶⁶ According to FEMA, “IPAWS delivers timely, geographically-targeted messages during emergencies to save lives and protect property through multiple communication pathways.”⁶⁷

⁵⁹ FEMA, “Tools for Practitioners, Broadcasters and Wireless Providers,” <https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system/broadcasters-wireless>.

⁶⁰ This provision is similar to §6 of the Radio Act of 1927 (P.L. 69-632), which the Communications Act of 1934 superseded.

⁶¹ FCC established the Emergency Alert System (EAS) in 1994. FCC, “Amendment of Part 73, Subpart G, of the Commission’s Rules Regarding the Emergency Broadcast System, Report and Order and Further Notice of Proposed Rulemaking, FCC 94-288,” 10 *FCC Record* 1786, 1788 December 9, 1994.

⁶² 47 C.F.R. §§11.2(a) and 11.31. EAS participants are electronic media that FCC requires to comply with its EAS rules for the purpose of transmitting presidential alerts. Such media include broadcast radio and television stations, cable television systems, direct broadcast satellite systems, satellite digital audio radio service (SDARS), digital audio broadcasting systems, and wireline video systems. 47 C.F.R. §11.2(b).

⁶³ U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, “Emergency Alert System (EAS),” https://www.weather.gov/nwr/eas_description.

⁶⁴ FCC, Public Safety and Homeland Security Bureau, *Report: October 4, 2023 Nationwide Emergency Alert Test*, June 2024, p. 28, <https://docs.fcc.gov/public/attachments/DOC-403500A1.pdf>. (hereinafter FCC 2024 Nationwide EAS Test Report).

⁶⁵ *Ibid.*, p. 28, n. 95.

⁶⁶ Executive Office of the President, “Public Alert and Warning System,” 71 *Federal Register* 36975, June 26, 2006.

⁶⁷ FEMA, “Tools for Practitioners, IPAWS, IPAWS Program Governance,” <https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system/governance>.

Role of AM Radio Stations

Under the traditional broadcast-based distribution structure, known as the “EAS protocol,” EAS transmits an alert through a preestablished hierarchy of broadcast, cable, and satellite systems, beginning with initial delivery to 72 National Public Warning Systems stations, also known as Primary Entry Point (PEP) stations.⁶⁸ Of those stations, 62, or 86%, are broadcast AM stations.⁶⁹ SiriusXM provides satellite-based backup to the broadcast-based PEP system in the event of a nationwide alert;⁷⁰ but as a nationwide service, it does not supply local programming and therefore does not participate in the distribution of state and local alerts.⁷¹

Pursuant to the Integrated Public Alert and Warning System Modernization Act of 2015 (P.L. 114-143), Congress directed FEMA to upgrade PEP stations around the United States to ensure continuity of broadcast radio services.⁷² FEMA equips PEPs, which are operated by local station personnel, with backup communications equipment and power generators that enable them to continue broadcasting information to the public during and after an emergency.⁷³ These freestanding emergency studios, located at the radio transmitter sites, are designed to withstand various natural disasters and acts of terrorism.

AM radio stations serve two roles during emergency alerts: (1) the initial points of contact for presidential and nonpresidential emergency alerts in the EAS broadcast-based transmission system, and (2) one of several technology-based communications pathways for nonpresidential emergency alerts.⁷⁴ For example, in September 2024, after residents in Asheville, NC, lost mobile and internet services following Tropical Storm Helene, the AM radio station WWNC remained on the air and transmitted emergency and recovery information to listeners.⁷⁵

Options for Congress

If Congress chooses to address the issue of the availability of AM radio in motor vehicles, it may consider one or more options, some of which were included in bills introduced in the 118th Congress. These options include (1) increasing NHTSA’s and/or FCC’s jurisdiction over motor vehicle equipment, (2) studying the role of and considering alternatives to AM radio in the

⁶⁸ For more details about this process, see FCC 2024 Nationwide Emergency Test Report, p. 29.

⁶⁹ CRS analysis of data from FEMA, “Emergency Management, Tools for Practitioners, Integrated Public Alert and Warning System (IPAWS), Broadcasters and Wireless Providers,” last updated December 14, 2023, <https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system/broadcasters-wireless>.

⁷⁰ FEMA, “FEMA and SiriusXM Expand Relationship to Enhance Delivery of Emergency Alerts,” press release, July 11, 2023, <https://www.fema.gov/press-release/20230711/fema-and-siriusxm-expand-relationship-enhance-delivery-emergency-alerts>. Pursuant to the agreement, SiriusXM provides a satellite-based delivery system to FEMA’s National Public Warning System network.

⁷¹ FCC, “Review of the Emergency Alert System, Order on Reconsideration FCC 19-57,” 34 *Federal Register* 5382, 5384, June 27, 2019.

⁷² Ibid. See also P.L. 114-143, §2(d) (6 U.S.C. §321o).

⁷³ FEMA, “FEMA and KIRO-AM Seattle to Unveil New Emergency Broadcast Studio,” press release, November 18, 2021, <https://www.fema.gov/press-release/20211118/fema-and-kiro-am-seattle-unveil-new-emergency-broadcast-studio>.

⁷⁴ Alternative, non-broadcast communications pathways include mobile wireless transmission and internet transmissions. FCC 2024 Nationwide EAS Test Report, p. 31, Figure 3.

⁷⁵ Sarah Honosky, “Helene Trapped Asheville Broadcasters in Their Station. They’ve Stayed on Air Ever Since,” *Asheville Citizen Times*, October 7, 2024, <https://www.citizen-times.com/story/news/local/2024/10/07/wnc-listeners-call-into-local-radio-station-seeking-solace-connection/75543836007/>.

transmission of national and emergency alerts, and (3) monitoring industry developments without enacting legislation.

Increase Federal Jurisdiction Over Motor Vehicle Equipment

Congress could expand authorities of NHTSA, FCC, or both. Bills introduced in the 118th Congress focused on expanding NHTSA's authority. In September 2023, the Senate Committee on Commerce, Science and Transportation reported S. 1669, the AM Radio for Every Vehicle Act of 2023, with an amendment in the nature of a substitute. This bill would, similarly to H.R. 8449, direct NHTSA to issue a rule that requires all new passenger motor vehicles to install AM broadcast receivers as standard equipment.⁷⁶ The original version of S. 1669 would have, similarly to H.R. 3413, applied to all motor vehicles, including non-passenger vehicles. This bill would add a new authority for NHTSA, which does not preapprove or mandate the inclusion of specific electronic equipment in vehicles.

Alternatively, Congress could amend the definition of *motor vehicle safety* in Section 102(1) of the National Traffic and Motor Vehicle Safety Act of 1966, as amended,⁷⁷ to include protecting “the public against an unreasonable risk of accidents” and/or disasters occurring due to a driver’s inability to receive national and local emergency alerts. This would expand NHTSA’s current authority over vehicle safety.

To ensure that OEM equipment does not interfere with broadcast services, Congress could amend Section 302a of the Communications Act and/or direct FCC to repeal its current exemption for motor vehicle equipment with respect to the agency’s authorization requirements. To ensure that FCC’s rules do not interfere with vehicle safety, Congress could direct FCC to consult with NHTSA.

Direct Government Agencies to Issue Studies, Reports

Congress could direct the Comptroller General or other entities to conduct studies. All four of the “AM Radio for Every Vehicle Act” bills would direct the Comptroller General to conduct a study on emergency alert and warning systems. Two of those bills, H.R. 8449 and S. 1669, as reported, would stipulate that the study is to include an assessment of the role of passenger motor vehicles in IPAWS communications, including by providing access to AM broadcast stations.

FCC adopted the motor vehicle equipment exemption in its equipment authorization rules in 1980.⁷⁸ At the time, FCC stated that it saw “advantages in postponing the ... rules for [motor vehicle equipment and found] that additional information may be useful to further assess the impact of the ... rules on electronics in automobiles.”⁷⁹ Congress could direct FCC, in consultation with NHTSA, to study and report on the potential impact if the agency were to extend its rules to include motor vehicle equipment.

⁷⁶ The text of the amended version of this bill is similar to H.R. 8449, the AM Radio for Every Vehicle, which the House Committee on Energy and Commerce reported on November 18, 2024 (H.Rept. 118-740).

⁷⁷ 49 U.S.C. §30102(a)(8).

⁷⁸ FCC, “Amendment of Part 15 to Redefine and Clarify the Rules Governing Restricted Radiation Devices and Low Power Communication Devices, Order Granted in Part Reconsideration of First Report and Order Technical Standards for Computing Equipment, FCC 80-148,” *FCC Report, 2nd Series*, vol. 79, p. 67.

⁷⁹ *Ibid.*, p. 83.

Monitor the Private Sector

Members may consider waiting for industry participants to determine whether market conditions or other business factors support or oppose inclusion of AM radio receivers in motor vehicle models. Some OEMs, based on feedback from consumers or others, may choose to alter their plans about including AM radio receivers. In its December 2022 letter to Senator Edward J. Markey, the trade organization Auto Innovators stated that it has discussed with NAB and FEMA consumers' access emergency broadcast information in vehicles.⁸⁰ Members could follow up with these organizations to receive updated information about these meetings. Members could also continue to monitor and weigh in on developments via oversight letters.⁸¹

Members may also weigh the sufficiency of emergency alert systems in the presence or absence of AM radio receivers in motor vehicles. If OEMs were to exclude broadcast receivers from additional vehicles, the affected consumers may be less able to receive state and local emergency alerts. Additionally, if alternative communications pathways (i.e., wireless, satellite, and internet transmissions) become inoperable during a natural disaster or weather event, national-level emergency alerts might be affected. Members could weigh the potential cost of risking this scenario against the potential benefit of permitting OEMs to make what some might consider to be a business decision.

Author Information

Dana A. Scherer
Specialist in Telecommunications Policy

Disclaimer

This document was prepared by the Congressional Research Service (CRS). CRS serves as nonpartisan shared staff to congressional committees and Members of Congress. It operates solely at the behest of and under the direction of Congress. Information in a CRS Report should not be relied upon for purposes other than public understanding of information that has been provided by CRS to Members of Congress in connection with CRS's institutional role. CRS Reports, as a work of the United States Government, are not subject to copyright protection in the United States. Any CRS Report may be reproduced and distributed in its entirety without permission from CRS. However, as a CRS Report may include copyrighted images or material from a third party, you may need to obtain the permission of the copyright holder if you wish to copy or otherwise use copyrighted material.

⁸⁰ Letter from Garrick Francis, vice president, Federal Affairs, Alliance for Automotive Innovation, to Sen. Edward J. Markey, December 20, 2022, pp. 20-22, https://www.markey.senate.gov/imo/media/doc/letters_of_automaker_responses_-_030823pdf.pdf.

⁸¹ U.S. Senate Committee on Commerce, Science, and Transportation, "Sens. Cruz and Markey Send Bipartisan Letter Urging Automakers to Keep AM Radio in Vehicles," press release, June 23, 2023, <https://www.commerce.senate.gov/2023/6/sens-cruz-and-markey-send-bipartisan-letter-urging-automakers-to-keep-am-radio-in-vehicles>.