



## FM Radio and RBDS-Based Emergency Alerting

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### Introduction

The *FM Radio and RBDS-Based Emergency Alerting* research brief, and 2-page executive summary *Save Lives, Withstand Catastrophe, and Stimulate the Marketplace*, were submitted as Ex Parte comments replying to the FCC's *Hurricane Response Public Notice* [PS Docket # 17-344].<sup>1</sup> The Public Notice sought input on the effectiveness of emergency communications technologies, procedures, and policies that were employed in response to hurricanes Harvey, Irma, Maria, and Nate and "additional information relevant to the 2017 hurricane season's impact on communications generally."<sup>2</sup> The Wireless RERC's comments were submitted as near-future considerations for remediating temporary gaps in communications access. The intent was to supply unbiased considerations to help ensure that individuals with disabilities and other populations disproportionately impacted by disasters have alternative and accessible means to receive emergency information when cell coverage is disrupted, and access to power is limited in the wake of emergency events. The Ex Parte comments presented FM radio on mobile devices as a possible and pragmatic pathway that is not fully utilized in emergency alerting and subsequent dissemination of related emergency information. In recent years, market solutions regarding FM chip activation have emerged. Approximately 34% of mobile phones in the U.S. market include an FM radio feature.<sup>5</sup> The Wireless RERC asserted that if an effective industry strategy is taken, universal adoption of FM Radios in mobile devices could occur without the need for regulation.

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<sup>1</sup> Garcia, A., Bennett, D., LaForce, S., Mitchell, H., Price, E. (2018, February 7). Ex Parte comments submitted in response to *2017 Hurricane Response Public Notice* [Docket No. 17-344, Public Safety and Homeland Security Bureau]. Federal Communications Commission: Washington, D.C.

<sup>2</sup> FCC. (2017). *Hurricane Response Public Notice* [PS Docket # 17-344]. Retrieved from [https://apps.fcc.gov/edocs\\_public/attachmatch/DA-17-1180A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DA-17-1180A1.pdf)

On February 27, 2018, Dr. Helena Mitchell presented the comments at an Ex Parte meeting at the FCC. The meeting was attended by representatives from the Office of the Chairman, the Consumer and Governmental Affairs Bureau, and the Public Safety and Homeland Security Bureau. Their comments and questions are addressed in this addendum to our original filing. Specifically, the addendum provides additional contextual information on the status of WEA, FM Radio and the industry response to the 2017 Hurricane Season; the distinction between FM Radio and RBDS; how RBDS is different from captioning; and international use of FM Radio and RBDS.

## **Context**

For some individuals receipt of the warning is different depending solely on the channel used to disseminate the warning messages. For example, those listening to online streaming audio will not receive a warning message if sent only through the Emergency Alert System (EAS) (i.e., TV and radio). For people with varying disabilities, the mode in which emergency information is received is highly dependent on device and service accessibility. Regulatory agencies and industry have taken the lead to reconcile issues concerning full access to alerts and other emergency information by people with disabilities. Executive branch and federal agency<sup>3,4</sup> concern regarding the nation's emergency alerting capabilities and ensuring equal access to emergency alerts resulted in integrating multiple infrastructures and methods used for emergency alerting (broadcast, cellular, internet protocol) into a unified system, the Integrated Public Alert and Warning System (IPAWS), of which Wireless Emergency Alerts (WEAs) are a component. WEAs are a successful public-private partnership that leverages commonly used technology to integrate emergency message receipt into an increasingly mobile and mobile-only population. Since WEA is automatic (i.e., the user can opt out), WEAs can reach populations moving away from hard-wired (land-line) phones, those uninclined to subscribe to local alerting systems, and people with disabilities who have expressed that WEAs have advanced emergency alerting access. In a 2015 WEA Survey, 61% of all respondents found that WEA was an improvement over how they have received emergency alerts in the past. Fifty-seven percent (57%) of respondents with disabilities found WEA better, and 36% found it the same (i.e., as good as) as prior methods. Only 6% and 4% of respondents with and

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<sup>3</sup> Presidential Executive Order 13407 (2006). *Public Alert & warning System*. June 26.

<sup>4</sup> Federal Communications Commission (2007). *In the matter of the Review of the Emergency Alert System, Second Report and Order and Further Notice of Proposed Rulemaking*, (EB Docket No. 04-296), 12 July.

without disabilities (respectively) found WEAs to be worse than prior methods of receiving emergency alerts.<sup>5</sup>

WEA specifically, and emergency communications, in general, are evolving the use of wireless devices as an emergency lifeline during disaster events (e.g., social media posts for help when 911 is down). With people organically turning to alternative means to access emergency services and information when cell service is disrupted or experiencing network congestion, emergency managers can use this same medium to *direct* the public towards services that will not further tax the network (e.g., local news via television and radio if power is available, link to open FM Radio on their device if no access to broadcast TV, traditional radio, NOAA Weather Radio, battery operated, or crank radio is available).

As per CTIA's comments in response to the Hurricane Response Public Notice, the wireless networks demonstrated preparedness and mitigation efforts to maintain service during the hurricanes, and the towers by and large durably resisted the hurricane winds.<sup>6</sup> For example, Verizon reported that 98% of their towers in the impacted areas of Texas maintained functionality, while T-Mobile reported 85% of their towers remained operational. Further, service restoration in many cases was reportedly expedient. When it was not, other factors, not attributable to the wireless carriers were at play, such as electrical power outages.<sup>7</sup> Though wireless carrier network resiliency has improved significantly, as demonstrated during the 2017 hurricane season, it is the gaps, whether 2% or 15%, that are concerning. This is not meant to suggest that 100% resiliency is the expectation, or to lay the total burden at the feet of the wireless industry, but rather to acknowledge that natural and human-made disaster events disrupt communications in unanticipated ways, and with more pathways available, more people can receive critical information in the wake of disaster.

CTIA also commented that broadcast and wireless services should be perceived as complementary, rather comparatively and the Wireless RERC agrees. The recommendation of FM Radio access as a stop-gap measure in the wake of extreme events was intended to be a method to showcase the synergies of the two services. According to National Association of Broadcasters chief technology officer Sam Matheny, because of partnerships between wireless manufacturers and the broadcasting industry, "Americans are able to access FM radio through their smartphones

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<sup>5</sup> Center for Advanced Communications Policy. (2015). 2015 WEA Survey Data. Unpublished raw data.

<sup>6</sup> CTIA. (2017). Reply comments submitted in response to the *Public Notice Response Efforts Undertaken During 2017 Hurricane Season* [17-344]. Available at <https://ecfsapi.fcc.gov/file/1022225667281/180221%20CTIA%20Hurricane%20Response%20PN%20Reply%20Comments%20FINAL.pdf>

<sup>7</sup> *Ibid*, 7.

during times of emergency, even when the cellular network may be down due to congestion or physical damage.<sup>8</sup>” This capability, however, is fragmented as only a portion of phone models have an FM radio feature. Though the Wireless RERC indicated that regulatory action on the matter could address fragmentation, we also suggested that a market response could nullify the need for regulatory intervention.

### **FM Radio Chip and RBDS**

Radio towers can transmit important updates and information to phones that contain activated FM radio chips. FM radio chips are small pieces of hardware that act as receivers for radio frequencies that can be included in consumer devices to add a radio feature. The chips receive FM radio waves which fall within the 88 to 108 MHz frequencies. These chips can serve as an extra line of emergency information when cell towers and power grids are not operational due to damage. Of course, radio towers can also go offline, but because 77 radio stations are part of the EAS architecture as PEP stations, they receive federal funding to support operating efforts under extreme conditions.<sup>9</sup>

Radio Broadcast Data Service (RBDS) is a standard for providing data-casting transmitted on the 57-kHz subcarrier of terrestrial FM radio stations in the United States. First introduced for use in car radios in the early 1990s, RBDS is commonly used for presenting radio text to show station name and call letters, type of programming, and artists’ names and song titles, traffic, advertisements, and more. It has also been used for “smart” highway traffic signs. The EAS has an RBDS program type code and can present the audio of an EAS message even if a CD is playing.<sup>10</sup> RBDS has been used and tested successfully in Mississippi, Tennessee, Alabama, Pennsylvania, Louisiana, and Washington D.C. RBDS alerting allows authorized alert originators such as emergency managers, university, and government officials to send geo-coded alert messages to intended recipients. This capability provides an additional form of alerting citizens and leverages

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<sup>8</sup> Matheny, S. (2017). Statement at the Senate Commerce, Science, and Transportation Committee Hearing, “This is Not a Drill: An Examination of Emergency Alert Systems.” Available at [https://www.commerce.senate.gov/public/\\_cache/files/b184b6e8-31b0-4d3f-9f34-929ba8abd45b/1AF13FA9BFE205889A386886C1ADFF8B.nab-matheny-1-25-18.pdf](https://www.commerce.senate.gov/public/_cache/files/b184b6e8-31b0-4d3f-9f34-929ba8abd45b/1AF13FA9BFE205889A386886C1ADFF8B.nab-matheny-1-25-18.pdf)

<sup>9</sup> Federal Emergency Management Agency. (2018). The National Public Warning System.

<sup>10</sup> Department of Homeland Security: Science and Technology. (2014). *Accessible Common Alerting Protocol Radio Data System Demonstration: Gulf Coast States*. Department of Homeland Security.

the existing FM radio broadcast infrastructure which has overlapping signals, reliable backup power, and transmitting systems.<sup>11</sup>

Using RBDS for mobile emergency alerting could deliver to the mobile phone, EAS audio emergency information and other emergency information (e.g., evacuation routes via the traffic announcement function) broadcasted from an FM radio station. RBDS integration into mobile phones could improve access to emergency information for people with sensory disabilities because it would allow for multiple modalities (audio, text, broadcast [during cell service interruption]) for receiving emergency information on a single device. This is especially important given the rise in wireless-only households,<sup>12</sup> and the decreased use of standard radios in favor of streaming services.<sup>13</sup>

#### *Why should RBDS and FM Radio be activated together?*

Activating RBDS in mobile phones and the FM radio chip would enable more options for mobile emergency information. Provision of emergency alerts and information in multiple modalities increases the probability that the end-user with a sensory disability will be able to access at least one of the options for additional emergency information that is disseminated after the initial EAS or WEA message. Absent emergency information for a lengthy period could embolden individuals and families to take desperate and dangerous actions. On the other hand, individuals that are stranded in their homes, with no power or cell service, receiving updates via a mobile-enabled FM radio can reduce the desire to take actions that may put them at greater risk.

#### *What is the difference between captions and RBDS?*

RBDS is different from captions in that it utilizes radio broadcast spectrum to deliver text and audio content, whereas captions are most often used in video programming and can be delivered by video programmers over broadcast, cable and satellite television, and also using Internet Protocol for online video content.

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<sup>11</sup> FCC (2010) FCC Implementation of the Twenty-First Century Communications and Video Accessibility Act [Pub. L. 111-260]. Available at <https://prodnet.www.neca.org/publicationsdocs/wwpdf/113010fccpresentation.pdf>

<sup>12</sup> Blumberg, S. J., Luke, J. V. (2017). Wireless substitution: early release of estimates from the national health interview survey, July–December 2016. Available at <https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201705.pdf>

<sup>13</sup> Miller, L. S. (2017). Paradigm shift: Why radio must adapt to the rise of digital. Available at <http://bit.ly/mrpswrmttrod>

## **International Use of FM Radio and RBDS for Emergency Communications**

RBDS for emergency alerting on mobile devices is not a novel concept. In 2012, researchers noted that FM-RDS<sup>14</sup> was used via DISANET to broadcast emergency communications. DISANET is a disaster communication system developed by both Indian and Japanese researchers.<sup>15</sup> They found that it is both easy to deploy and well-suited for disaster areas. The European Broadcasting Union (EBU) established a broadcasting standard for the Digital Audio Broadcasting (DAB) system to be compatible with mobile devices for which they anticipated emergency communications to be a feature.<sup>16</sup> Researchers in South Korea evaluated how accessible information can be transmitted through radio-based sub-channel transport (such as RDS) and found that a higher bit-rate would allow for multimedia content. This level of accessibility in communications could include audio messaging for people with vision disabilities; video clips related to the emergency that includes an American Sign Language (ASL) interpretation and captions for people with hearing disabilities; and maps depicting the evacuation route or shelter locations.<sup>17</sup>

## **Conclusion**

Communications during emergencies are changing. Often traditional SMS, used with subscription-based alerting, is slow during disasters in population-dense areas. WEA alerts are more expedient; however, its reach is predicated on local and state officials having become an IPAWS alerting authority. Further, there are some EAS activations originated by local officials that are distributed through local broadcast stations. These may not go through FEMA IPAWS and consequently WEA, especially if the local officials (1) are not authorized to connect to IPAWS, (2) do not have the software and equipment to connect to IPAWS, or (3) do not have internet connectivity, among other reasons. Therefore, those local EAS activations might be missed by cell phone users, but adding the capability in the cell phone to receive the local EAS activation via FM radio could be a preventative measure.

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<sup>14</sup> Radio Broadcast Data Service (RBDS) is a standard for providing digital information on FM radio broadcast stations in the U.S. similar to the Radio Data Service (RDS) in Europe.

<sup>15</sup> Jalihal, D., R.D. Kolipillai, P. Khawas, Keiji Takeda, Kotaro Kataoka. (2012). A Rapidly Deployable Disaster Communications System for Developing Countries. IEEE.

<sup>16</sup> Emergency Broadcasting Union-Union Europeenne de Radio-Television (EBU-UER). (2006). Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to Mobile, Portable and Fixed Receivers. ETSI EN 300-401 V1.4.1

<sup>17</sup> Choi, Seong Jong. (2007). Analysis of Emergency Alert Services and Systems. *2007 International Conference on Convergence Information Technology*.

A robust relationship between the broadcast industry and the wireless industry which respects both sides of the issues could remedy emergency alert and information access concerns held by providers, emergency managers, and by the public. The potential uses for RBDS are great and in some locations, such as in rural areas where broadcast signals are readily available, or areas where RBDS is already being researched and developed. Such a complementary relationship between broadcast and wireless industries could greatly benefit underserved minority, disability, and rural populations during emergencies.

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### **About the Wireless RERC**

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