

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of:)	
)	
Wireless Emergency Alerts)	PS Docket No. 15-91
)	
Amendment of Part 11 of the Commission's)	PS Docket No. 15-94
Rules Regarding the Emergency Alert System)	
)	

COMMENTS OF CTIA

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CTIA¹ respectfully submits these comments in response to the Public Notice seeking comment on the feasibility of including multimedia content in the Wireless Emergency Alert (WEA) messages.²

I. INTRODUCTION AND SUMMARY.

CTIA and its member companies have consistently supported the development, use, and evolution of the WEA system. Recent emergency situations, including unprecedented hurricane, flooding, and wildfire events, have demonstrated the important role of WEA as a tool to disseminate critical and lifesaving information to millions of wireless consumers. Further, CTIA and its member companies recognize that mobile wireless technologies and the mission of public safety have evolved since the WEA system was designed and began operating in 2012. To that

¹ CTIA[®] (www.ctia.org) represents the U.S. wireless communications industry and the companies throughout the mobile ecosystem that enable Americans to lead a 21st century connected life. The association's members include wireless carriers, device manufacturers, suppliers as well as apps and content companies. CTIA vigorously advocates at all levels of government for policies that foster continued wireless innovation and investment. The association also coordinates the industry's voluntary best practices, hosts educational events that promote the wireless industry and co-produces the industry's leading wireless tradeshow. CTIA was founded in 1984 and is based in Washington, D.C.

² *Parties Asked to Refresh the Record on Facilitating Multimedia Content in Wireless Emergency Alerts*, PS Docket Nos. 15-91, 15-94, DA 18-302 (rel. Mar. 28, 2018) (*WEA Multimedia Public Notice*).

end, the wireless industry has worked diligently and voluntarily to enhance and modernize WEA in just the past few years.

Most relevant to the Commission's *WEA Multimedia Public Notice*, the Commission now requires Participating Commercial Mobile Service (CMS) Providers to support the transmission of embedded Uniform Resource Locators (URLs) and phone numbers in WEA Alert Messages. In adopting the embedded URL requirements, the Commission noted that this upgrade "will dramatically improve WEA's effectiveness" and highlighted that "the public safety community views this change as the most important among all those we consider in this proceeding. . . ." ³ Thus, through embedded URLs available today, alert originators can "transform the scope of WEA from a character-limited text message service to a multimedia-enabled, comprehensive disaster response resource," in order to provide information to spur the public to action during an emergency. ⁴

With regard to embedding multimedia content within a WEA message, however, CTIA and its member companies encourage the Commission to recognize the significant technical and operational limitations – both with wireless networks and WEA-capable devices – that would be very challenging to overcome within the WEA system. As explained in these comments, the WEA system was intentionally designed to transmit only very small amounts of text data to ensure the timely delivery of WEA messages to millions of wireless consumers.

Nonetheless, CTIA and its member companies look forward to discussing these issues with the alert originator community and working collaboratively to evaluate ways that mobile

³ *Wireless Emergency Alerts; Amendments to Part 11 of the Commission's Rules Regarding the Emergency Alert System*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 11112, 11132 ¶¶ 27 and 80 (2016) (*2016 WEA Report and Order and FNPRM*).

⁴ *Id.*

wireless technologies can further enhance the WEA system to meet the evolving public safety mission. By focusing on reasonable and practical methods for designing, implementing, and enhancing the voluntary WEA system and allowing the time for standards-based technology to be developed, tested, and implemented, the Commission can maintain the important role of the WEA system to the safety and security of America's wireless consumers.

II. EMBEDDED LINKS WITHIN WEA MESSAGES ENABLE ALERT ORIGINATORS TO SEND MULTIMEDIA EMERGENCY INFORMATION TODAY.

CTIA and its member companies agree with the Commission and alert originator community's view that access to graphic, non-text information can help warn and inform consumers about emergencies and enhance the life-saving capacity of WEA. Today, alert originators can direct consumers to such content by embedding "clickable" links into WEA messages. Embedded links enable alert originators to direct a consumer to any multimedia content that is deemed necessary for the particular emergency, including images of maps or people, videos, or text content without character limits. In fact, the Commission has identified the inclusion of embedded references in WEA messages "as the most critical" among the many improvements to WEA that have been implemented over the last few years.⁵

Since the inception of the WEA system less than a decade ago, the wireless industry has worked cooperatively and collaboratively with alert originators, the Federal Emergency Management Agency (FEMA), and the Commission to support the delivery of critical, life-saving emergency information directly to consumers. The hallmark of these efforts has been the development of reasonable and practical methods for designing, deploying, and enhancing the voluntary WEA system and allowing the time for standards-based technology to be developed,

⁵ 2016 WEA Report and Order and FNPRM at ¶ 35.

tested, and implemented. In just the past year, as well as in the next couple of years ahead, Participating CMS Providers and equipment manufacturers have worked and will work diligently to enhance the WEA system by:

- Improving geo-targeting capabilities from cell sector to “best approximate” location in 2017;⁶
- Enabling embedded “clickable” links within a WEA message in 2017;⁷
- Expanding WEA message text from 90 to 360 characters by May of 2019;⁸
- Supporting Spanish language text by May of 2019;⁹
- Enabling alert originators to live test WEA on an “opt in” basis by May of 2019;¹⁰ and
- Supporting further enhancements to geo-targeting capabilities through device-based solutions to minimize the overshoot of WEA messages by November of 2019.¹¹

These extensive modifications to WEA and its supporting standards have required significant time and effort. For example, approximately 25 industry standards require review and update to implement enhanced geo-targeting capabilities.¹² Thus, the Commission should be aware that any new modifications to the WEA system will likely require similar efforts, which could present challenges to managing progress related to the enhancements noted above.

⁶ 47 C.F.R. § 10.450(a).

⁷ 47 C.F.R. § 10.441.

⁸ 47 C.F.R. § 10.430.

⁹ 47 C.F.R. § 10.480.

¹⁰ 47 C.F.R. § 10.350.

¹¹ See *Wireless Emergency Alerts; Amendments to Part 11 of the Commission’s Rules Regarding the Emergency Alert System*, FCC 18-4, 15-94, Second Report and Order and Second Order on Reconsideration, ¶ 39 (2018) (adopting a revised section 10.450 of the Commission’s rules).

¹² See Ex Parte Presentation of The Alliance for Telecommunications Industry Solutions (ATIS), PS Docket No. 15-91 at 2 (filed Jan. 23, 2018).

Of course, even with these enhancements, alert originators should be aware that transmitting multimedia content through embedded “clickable” links may be limited by the capacity of a participating mobile wireless network during the emergency, and whether a device is capable of supporting the embedded link within a WEA message.¹³ However, alert originators can take steps to mitigate and understand these potential limitations to effectively embed links within WEA messages and provide consumers with important multimedia content today.

To support alert originators utilization of embedded links, CTIA and its member companies are eager to work with the alert originator community and FEMA to develop alert originator best practices for delivering multimedia content associated with a WEA message. The Commission and FEMA should spur the development of these best practices and promote the ability of alert originators to send emergency multimedia information to consumers through WEA by harnessing the embedded link capabilities available today. By adhering to best practices and utilizing embedded links, alert originators can provide consumers with important multimedia content through WEA during times of emergency.

III. WHILE EMBEDDING MULTIMEDIA CONTENT WITHIN WEA MESSAGES PRESENTS TECHNICAL AND OPERATIONAL CHALLENGES, THE WIRELESS INDUSTRY REMAINS COMMITTED TO EXPLORING WAYS TO FURTHER ENHANCE THE WEA SYSTEM.

Despite the ability of alert originators to send multimedia content by using embedded “clickable” links today, CTIA and its member companies expect and understand that alert originators may still desire to modify the existing WEA system to support multimedia content

¹³ Many Participating CMS Providers’ WEA websites identify which of their WEA-capable devices support embedded links. Alert originators can direct consumers to Participating CMS Providers’ websites to inform consumers about whether their WEA-capable device is also capable of supporting “clickable” links.

directly within the WEA message. While supporting this capability presents significant technical and operational challenges, the wireless industry remains committed to exploring technological advances that may further enhance WEA in the future.

A. Transmitting Multimedia Content Within WEA Messages Presents Significant Technical and Operational Challenges.

The WEA platform was intentionally designed to ensure that alert originators can send time-sensitive information to millions of capable devices over wireless networks that have inherent spectrum and capacity limitations. The 3rd Generation Partnership Project (3GPP) standards governing the WEA system describe the data format used to transmit the WEA message through packets – or octets – over the control channel.¹⁴

Specifically, unlike point-to-point traffic and data channels on an LTE network that are designed to deliver high bandwidth content like video and broadband data, WEA messages are transmitted over a shared broadcast control channel with limited bandwidth.¹⁵ Although the limitations of the broadcast control channel constrain the size of a WEA message, a recipient who clicks on an embedded URL within a WEA message can access multimedia content via the same high bandwidth point-to-point data channels used for normal broadband services. As explained in more detail below, because control channel resources are primarily used to provide critical system information to a mobile device to gain access to the network, the current WEA

¹⁴ See 3GPP TS 23.041, TS 36.331, and TS 36.413. See also Alliance for Telecommunications Industry Solutions (ATIS), *Feasibility Study for LTE WEA Message Length* (ATIS-0700023), at 3 (Oct. 2015), https://access.atis.org/apps/group_public/download.php/25045/ATIS-0700023.pdf (ATIS Feasibility Study).

¹⁵ Data transmitted over the control channel is delivered using a Master Information Block (MIB) and a number of System Information Blocks (SIBs). WEA messages are transmitted on SIB 12, which is on a Physical Downlink Shared Channel (PDSCH) (not a dedicated channel) through Radio Resource Control (RRC) that is limited in capacity. The 3GPP TS 36.331 standard describes how scheduling and network resources are handled for SIBs.

best practices limit how WEA messages can be sent over the control channel to avoid adverse effects to other network operations.

WEA Message Size Limitations Help to Maintain Critical Wireless Network Functions During Emergencies. For LTE, the predominant mobile wireless network technology deployed throughout the U.S. today, WEA messages are sent over the air using Cell Broadcast. The number of bits that can be carried in a single segment of a WEA message is approximately 1736 bits, or as much as 217 bytes.¹⁶ This is a theoretical maximum value, as the number of bits available for a segment of a WEA message depends on the Participating CMS Provider's bandwidth and coding rate.¹⁷

For non-text content, such as an image, the Commission's CSRIC IV determined that an adequate file size could be in the range of 5 to 10 kB, or 5000 to 10,000 bytes.¹⁸ If a WEA message has more bits than the Cell Broadcast standard allows, the bits could be transmitted using segmentation, up to 64 segments.¹⁹ However, due to the potential for interfering with other critical control channel functions, the current WEA best practices limit the number of segments to four. While a WEA message could potentially be compressed to shorten the number of bits required to transmit the non-text content, such compression techniques would offer only

¹⁶ ATIS Feasibility Study at 8.

¹⁷ *Id.*

¹⁸ Communications Security, Reliability and Interoperability Council IV (CSRIC IV), *Working Group 2 (WG-2) Geographic Targeting, Message Content and Character Limitation Subgroup Report*, at 34 (Oct. 2014), https://transition.fcc.gov/pshs/advisory/csr4/CSRIC_CMAS_Geo-Target_Msg_Content_Msg_Len_Rpt_Final.pdf (CSRIC IV Report).

¹⁹ ATIS Feasibility Study at 8.

marginal benefit to transmitting non-text content through WEA messages because large text files would still need to be segmented, which is problematic for various reasons.

As an example of segmentation, a 5 kB image would require approximately 17 segments to be sent, while a 10 kB image would require 34 segments.²⁰ As numerous segments would be broadcast and concatenated to allow for the delivery of even a 5 to 10 kB image, sending large non-text content through WEA would exceed the current four segment best practice, thus potentially overwhelming the capacity of the control channel and undermining the proper functioning of the Participating CMS Provider's network. For this reason, the limitations on the text data file size of WEA messages are necessary to protect other required control channel operations that support the mobile wireless network, such as call and data setups, handoffs, and other critical network functions that are essential during emergencies when WEA messages are sent.²¹

Technical experts must evaluate whether increasing the number of segments available for WEA text data to support transmitting non-text content would overwhelm the limited resources available to the control channel. Using the control channel beyond its intended purpose could pose a significant risk that critical system information may not be available to mobile devices, which could impact the ability of consumers to respond to an emergency. Notably, the greatest risk is the potential for a denial-of-service event during an emergency, which could occur due to overloading of the network's shared control channel resources. However, even before further technical evaluation to address these issues, there are critical policy issues and tradeoffs that require further discussion and evaluation.

²⁰ CSRIC IV Report at 35.

²¹ See 3GPP TS 36.331.

Transmitting Non-Text Content Through WEA Presents Tradeoffs That Require Further Discussion and Evaluation. Segmenting WEA messages to support non-text content would introduce significant policy issues and tradeoffs that WEA stakeholders, including Participating CMS Providers and alert originators, should carefully consider. First and foremost, to maintain the operation of the LTE network, Cell Broadcast best practices require that the broadcast message be kept to a reasonable size to ensure that other broadcast messages (used to control the LTE network) are delivered – otherwise, the overall LTE network may not function properly, as discussed above.²² From a technical perspective, the existing WEA system would require a fundamental change to the Cell Broadcast standard to adequately manage even small non-text content (even if those file sizes were limited to 5 to 10 kB). Thus, a global standards effort would be necessary to maintain global interoperability and roaming.

On the network side of the WEA platform, the LTE standardized delivery method transmits with a set delay between each segment of a message.²³ These delays are pre-configured into mobile base stations and can range from 80 milliseconds to 5.12 seconds, with each operator specifying the value on their network based on engineering and operational considerations.²⁴ Thus, assuming current transmission delays, a 5 kB image (that requires 17 segments) could take from 1.28 to 82 seconds to be delivered, while a 10 kB image (that requires 34 segments) could take from 2.56 to 164 seconds.

²² CSRIC IV Report at 35.

²³ ATIS Feasibility Study at 12.

²⁴ *Id.*

Moreover, attempting to segment a large message, such as an image or video, over multiple WEA messages will also present significant challenges on the device side. If the message is segmented across multiple WEA messages, the mobile device will have to wait until all the segments are received before displaying the WEA message.²⁵ The mobile device will then need to reassemble the segments – which would require new standards and changes in the mobile device behavior.²⁶ Further compounding the issue of delay, a mobile device that has not received the necessary segments of the message prior to the time the Participating CMS Provider may repeat the WEA message would likely have to start the process all over again. In short, the more segments added to a WEA message, the more difficult it will be to reassemble the communication, which will result in additional delay presenting the WEA message to consumers.

As the Commission noted previously: “We would not want the transmission of multimedia content to delay receipt of the most time-sensitive Alert Message text. At the same time, however, we also believe that there are circumstances where the public would benefit from the receipt of multimedia content over WEA cell broadcast, even if they have to wait a minute to receive it.”²⁷ When combined with other FCC obligations for new WEA features (such as enhanced geo-targeting and the delivery of Spanish language WEA alerts), adding non-text content to a WEA message may result in additional delays in the delivery of the WEA message to the consumer. Generally, the Commission and alert originators should be wary of any solutions to deliver non-text content within a WEA message that would significantly risk delay

²⁵ *Id.* at 16.

²⁶ The current SIB 12 used for WEA delivery would need to be modified to have the contents of the message passed to the application layer – a functionality that does not currently exist.

²⁷ 2016 WEA Report and Order and FNRPM at ¶ 127.

of time-sensitive emergency information. However, the Commission and WEA stakeholders, including alert originators and Participating CMS Providers, should work collaboratively to determine the appropriate tradeoffs between sending non-text WEA content and the potential for delay in displaying the WEA message to a consumer.

B. eMBMS Is Not Available for WEA Today and Will Not Likely Offer the Same Coverage.

Separately, the Commission has suggested that there may be an opportunity to allow for multimedia within WEA messages through the use of evolved Multimedia Broadcast Multicast Service (eMBMS), which is part of the 3GPP standards supporting LTE. However, the ability of eMBMS to support WEA messages remains unclear, if not unlikely for the foreseeable future. Unlike WEA's near-ubiquitous availability, eMBMS functionality has been very limited to "hot spots" with dense capacity needs for video.

Further, implementation of eMBMS would require significant technical and operational changes in the handling of WEA messages.²⁸ As an example of the type of effort this would require, approximately 25 industry standards needed to be reviewed and updated to implement enhanced geo-targeting capabilities.²⁹ Modifying eMBMS to support the WEA system would likely involve a similar level of effort and may also require updates to the underlying wireless standards as well. As noted above, the current WEA platform relies on the Cell Broadcast standard that transmits WEA messages on the control channel of the wireless network, which all

²⁸ See Comments of AT&T Services, Inc., PS Docket No. 15-91, at 14-15 (filed Jan. 13, 2016); Comments of The Alliance for Telecommunications Industry Solutions (ATIS), PS Docket No. 15-91 at 9-10 (filed Jan. 13, 2016) (noting that eMBMS is not widely deployed and standardization efforts for WEA-related modifications would take significant time).

²⁹ ATIS Ex Parte *supra* note 12.

devices constantly monitor to obtain system information. Conversely, eMBMS would travel over a different channel on the wireless network – which a device only monitors if it has been directed to listen to the channel.

Thus, implementation of eMBMS would require a new mechanism to be developed and standardized in WEA to direct the device to constantly listen to the eMBMS WEA broadcast. Further, eMBMS support for WEA would only be available in areas where there is an eMBMS deployment with multimedia provided by alert originators, as well as WEA-capable devices that support eMBMS. For these reasons, eMBMS is simply not available to support multimedia content for WEA today, and the time and resources necessary to modify eMBMS to support WEA may not be justified by limited coverage that is required to meet the intended design of the current WEA system.

C. Evaluation of 5G for WEA Requires Further Exploration and Discussion.

Looking ahead, CTIA and its member companies will continue to evaluate whether technological advances in 5G and beyond can enhance WEA. 5G's enhanced mobile broadband may further enable the ability for consumers to obtain multimedia WEA content through embedded links in WEA messages. In addition, the network densification and cell site density that may be necessary for millimeter wave deployments in urban areas to enable 5G could further enhance the network-based geo-targeting capabilities of the WEA system.

It is important to note, however, that the global standards for 5G are based on the proven 4G LTE cell broadcast-based WEA system design. For this reason, 5G will continue to leverage the broadcast of WEA messages using standards-defined Cell Broadcast over the radio control channel, consistent with existing 4G LTE capabilities for WEA. Thus, for the foreseeable future, WEA in 5G will continue to have the same technical and operational capabilities and constraints as WEA in 4G LTE.

For this reason, further exploration and discussion is necessary to determine whether 5G could enable the delivery of multimedia within WEA messages beyond the use of embedded links. CTIA and its members companies look forward to reviewing the record, the forthcoming report from CSRIC VI Working Group 2 – *Comprehensive Re-Imagining of Emergency Alerting*, and engaging in discussions with the alert originator community to determine how WEA can be further enhanced.

IV. CONCLUSION.

While embedding multimedia content within WEA messages raises substantial technical and operational issues, CTIA and its member companies look forward to reviewing the record and welcome any opportunity to engage in a robust dialogue with the alert originator community to explore technological advances that may help enhance WEA in the future. In the meantime, CTIA and its member companies strongly encourage the Commission and FEMA to lead the development of best practices and promote the ability of alert originators to send emergency multimedia information to consumers through WEA by utilizing the embedded link capabilities available today.

Respectfully Submitted,

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