Before the Federal Communications Commission
Washington, D.C. 20554

In the Matter of
Modernization of the Nation's Alerting Systems
PS Docket No. 25-224
PS Docket No. 15-94
PS Docket No. 15-91

COMMENTS OF TIMOTHY KRAMER (KR8MER)

I submit these comments as the maintainer and developer of EAS Station™, an open-source, software-defined Emergency Alert System research platform.

Project Resources
Project Website: https://easstation.com
Project Documentation: https://easstation.com/about
Source Code Repository: https://github.com/KR8MER/eas-station

I strongly support the Commission's proposal to permit Emergency Alert System functionality to be implemented in software rather than requiring dedicated proprietary hardware appliances.

My comments are based on the development and operation of a functioning software-defined EAS implementation. EAS Station was created specifically to explore whether modern commodity hardware and open software architectures could reliably perform the functions historically associated with dedicated EAS encoder/decoder hardware.

The answer is yes.

EAS Station currently implements:

- CAP alert ingestion from FEMA IPAWS and NOAA/NWS sources
- SAME/EAS header generation and validation
- FCC Part 11 attention signal generation
- Text-to-speech message generation
- Geospatial filtering using PostGIS and polygon-based alert targeting
- Software-defined radio monitoring and off-air verification

• GPS-disciplined Stratum-1 time synchronization
• Multi-factor authentication and role-based access control
• Cryptographic audit logging and event tracking
• Hardware integrations including GPIO relays, LED signage, paging interfaces, and external notification systems

Importantly, these functions operate on commodity Linux hardware, including Raspberry Pi-class systems, without specialized proprietary alerting hardware.

This demonstrates that software-defined EAS architectures are not theoretical. They are practical, achievable, and deployable using modern computing platforms.

The Commission correctly recognizes that software-based architectures provide significant advantages in cybersecurity, maintainability, and operational visibility.

Traditional alerting appliances often depend on infrequent firmware releases and closed development ecosystems. Modern software platforms allow rapid deployment of security updates, improved vulnerability management, centralized logging, and stronger authentication controls.

In developing EAS Station, I implemented several features that align closely with the Commission's cybersecurity objectives, including:

• Multi-factor authentication
• Strong password enforcement
• Cryptographic audit trails
• Role-based access controls
• Network segmentation support
• Alert validation and verification workflows

One area where software-defined architectures excel is SDR-based monitoring and confidence verification. EAS Station continuously monitors alert audio, decodes SAME headers, validates alert content, and verifies that transmitted messages match expected outputs.

Additionally, software-defined systems allow implementation of advanced geospatial alerting techniques that exceed the capabilities of many legacy systems. By leveraging GIS databases and polygon-based filtering, alerts can be targeted with greater precision while reducing over-alerting.

I believe the Commission should maintain rigorous certification requirements for software-defined EAS implementations. Emergency alerting is life-safety infrastructure and should continue to meet high standards for reliability, interoperability, security, and auditability.

However, certification should focus on demonstrated compliance and operational performance rather than requiring a particular hardware implementation model.

The historical assumption that EAS functionality must reside in dedicated proprietary hardware no longer reflects modern engineering realities.

Software-defined architectures can provide:

• Improved cybersecurity
• Greater transparency and auditability
• Faster security patching
• Enhanced observability
• Improved geospatial accuracy
• Reduced deployment costs

• Increased flexibility and resiliency

The future of emergency alerting should be standards-based, secure, auditable, and software-defined.

My experience developing EAS Station demonstrates that these goals are achievable today using modern software engineering practices and commodity hardware platforms.

Respectfully submitted,

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