Allied Radio Matrix for Emergency Response (ARMER)
Standards, Protocols, Procedures

Document Section 1	**Management of System**	**Status:** Complete
State Standard Number	**1.7.0**	
Standard Title	**Subscriber Radio Standards**	
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Replaces Document Dated		
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1. Purpose or Objective

The purpose of this standard is to

- Set minimum technical and performance standards for subscriber radios allowed to operate on the Allied Radio Matrix for Emergency Response (ARMER).
- Establish a policy avoiding premature obsolescence of subscriber radios.
- Establish procedures for the Statewide Emergency Communications Board (SECRB) to measure, test, certify, and

  publish a list of subscriber radios which are approved for use on the system.

~~2. Technical Background~~

- **Capabilities**

The Backbone System utilizes the digital communications technology specified in the TIA/EIA-102 Series Standards, Interim Standards, and Telecommunications Systems Bulletins, commonly known as "Project 25." Project 25 provides for full backward migration and limited forward migration along an evolving continuum of technologies, frequency bands, and services. Project 25 also permits different vendors of subscriber radios and infrastructure to provide value added vendor specific premium features and services. The Initial Network utilizes Project 25 modulation method known as QPSK narrowband simulcast and C4FM narrowband non-simulcast modulation.

- **Constraints**

Subscriber radios from vendors utilizing different radio operating software will provide a variety of services, features, functionality, and performance to the users. Some radios will also interact differently with the infrastructure and could potentially exhibit undesirable operational characteristics. An example of this would be poor simulcast audio recovery, resulting in reduced geographic range, garbled audio, etc.

It is possible that new, unproven radios and/or software may exhibit performance and functionality characteristics that are destructive to the overall performance, capacity, and/or security of the Backbone System. An example of destructive functionality characteristics would be a radio which does not provide for site access roaming priority tables, resulting in indiscriminate roaming, which would scatter users to different radio frequency (RF) subsystems and sites.

3. Operational Context

Participants utilizing the system need access to radios that will meet their operational needs for the lowest cost. It is anticipated that radios capable of operation on the system will be available from multiple vendors over the life of the system. Users need the flexibility and knowledge to optimally choose from the available "universe" of radios available in the marketplace, and at the same time be discouraged from purchasing and using radios which would be operationally

undesirable or problematic. Users are prohibited from using radios which would be detrimental to the system.

4. Recommended Protocol/ Standard

All subscriber radios meeting the applicable TIA/EIA Series 102 "APCO Project 25" Standards that DO NOT exhibit operational, performance, or other characteristics that substantially and measurably negatively impact the system or its users will be approved for use on the system. Before a new radio is approved for use on the system, it shall undergo a testing procedure with a working, sample radio operated on the system. Members of a radio test team shall be appointed by the Chairman of the Operations and Technical Committee (OTC) and will conduct actual radio tests. Once sample radios are obtained, the testing process should be completed as quickly and efficiently as practical so there is no delay in the availability of new radios to users.

5. Recommended Procedure

5.1 Certification of subscriber radios for operation on the system

- Identification of the radio proposed for use on the system. Radios or pre-production radios may be submitted for testing by any authorized user. Radio equipment manufacturers should work closely with an authorized user who is considering purchasing the proposed radio.
- Review of technical specifications to determine basic compliance with the TIA/EIA Series 102 Standards.
- Test the radio following the test procedure in appendix; note impacts from the radio, user, and system perspectives and document findings. Depending on proposed use, testing may include, but not be limited to, subjective audio quality, coverage, ergonomics/ease of use, interoperability, roaming/site access, scanning, site affiliation, registration/de-registration, inhibit, call types, encryption, etc.
- Review documentation, including programming manuals, user manuals, maintenance manuals, and training materials.
- Compile an assessment report indicating if the radio is approved for use on the system and if there are any limitations or other constraints.
- Upon completion of the testing process by the test team, the testing methods and results will be reviewed by the Operations and Technical Committee. The Operations and Technical Committee may conduct additional or repeat tests if the results are inconclusive or if there are questions regarding the severity of potential negative impacts.
- The final test report and any additional testing conducted by the Operations and Technical Committee will be submitted to the Statewide Emergency Communi cations Board for final action.
- A list of certified radios will be kept with the system documentation. Only radios on this list may be operated on the ARMER system.

5.2 De-certification of subscriber radios for operation on the system

5.2.1 De-certification due to a problem with previously certified radio

If a previously certified subscriber radio type begins to exhibit characteristics that are harmful to the operation of other users on the system, these radios will be retested and certification reviewed. The subscriber unit test procedures will be reviewed and updated to ensure proper testing of characteristic exhibited.

If a problem is due to the use of a new feature in the radio, that feature will not be allowed to be used until satisfactorily repaired and tested by the vendor for proper operation.

5.2.2 De-certification due to upgrade in system that obsoletes previously certified subscriber radio types.

If there is an upgrade to the system that renders a previously-approved subscriber radio inoperable on the system or would cause a previously-approved subscriber radio to operate in such a manner that it would be harmful to operation of other users on the system, these radios will be retested and certification reviewed.

6. Management

The Statewide System Manager is responsible for managing this procedure, including maintaining all testing and certification records, managing radio equipment manufacturer initiated submittals, and coordinating activities of the test team.