



P25 Standards Update & JLMRLTE (LMR-LTE) Interworking Update. August 2023

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Project 25 Standards TR-8 Update



TIA, APIC, Steering Committee and UNWG meetings have been scheduled for October 24 – 26 in Savannah, Georgia

Meeting schedule for these 3 days is being drafted.

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Project 25 Standards TR-8 Update



TR-8.1

- Creation of a High Signal Strength Intermodulation Rejection Test is in progress

This test will measure the ability of a P25 or analog conventional FM receiver to reject an unwanted broadband base station signal, thereby preventing degradation to the reception of a desired signal. The performance recommendations establish minimum levels of performance. Manufacturer specifications are expected to identify actual performance of specific products.

- Measurement Method and Performance Recommendations for FDMA have been published
- Measurement Method and Performance Recommendations for TDMA have been published
- FDMA Performance Recommendation spec change due to TDMA comment resolution has been published
- Analog FM Measurement Methods and Performance Recommendations review comments were requested by July 17. **Comments addressed in a draft revision. Comments on the draft revision are requested by September 14.**

Project 25 Standards TR-8 Update



TR-8.3

- A revision to the Key Fill Device Interface Standard is in progress

This will enable Key Fill Device (KFD) interface to a KMF, an Authentication Facility and another Key Fill Device. The revision will merge the draft addendum provided by the Encryption Task group with the currently published document.

- The revision is occurring in phases. Each phase covers specific sections. Phase 1, 2, 3, 4 **and 5** are complete. **Phase 6 is a final review of the entire document prior to going to ballot. Comments are requested by August 25.**
- Working with FPIC and NIST to consider a NIST approved MAC method for OTAR
 - Meeting with 8.3, NIST and FPIC held January 25, 2022. NIST explained CBC MAC vulnerabilities and provided a list of NIST approved MAC algorithms. Draft OTAR revision technical ballot closed June 15. **AACA-C has been published.** General comments on the OTAR revision have been deferred until after the CMAC revisions are published.

Project 25 Standards TR-8 Update



TR-8.3

- A revision to the Inter KMF Interface is in progress

Manufacturer testing revealed differing interpretations of the use of S/MIME that will be clarified to prevent future interoperability issues.

- **Comment resolution has been completed and a final review of the revised document is in progress. Comments are requested by August 25.**

Project 25 Standards TR-8 Update



ETG

- Definition of a Link Layer Encryption Security Service is in progress

This architecture work is occurring in the Encryption Task Group and is expected to impact several published TIA standards. This service is for improved Security for all air interfaces of P25. It protects control messages, hides group and individual IDs and is being designed to interoperate with legacy equipment.

- LLE Overview comment resolution is conditionally completed.
- LLE Messages and Procedures document comment resolution is in progress.
- MSI is working on LLE revisions to the FDMA Common Air Interface.
- Etherstack reviewed the KFD and OTAR Key Management expectations in the LLE Overview and has provided a submission on LLE KFD. Review is pending.
- Etherstack reviewed the wireline interface expectations in the LLE Overview document has provided submissions for LLE ISSI and DFSI. Review is pending

Project 25 Standards TR-8 Update



TR-8.10

- Work on a new standard for Location on PTT is in progress

This will provide location of a voice transmitting trunking subscriber to a dispatch operator with a mapping application. Due to previous, non standard deployments by both Motorola Solutions and L3Harris, draft documents distributed for review include both deployed methods and use the respective MFIDs.

- Addendums for FDMA Trunking documents will be considered first followed by TDMA trunking. **Comment resolution on both the L3Harris and MSI documents has been completed. Merging of the documents has been completed. Comment resolution on the merged documents is in progress.**
- Work on a new standard for FDMA and TDMA over the air User Alias is in progress

This feature enables a listening subscriber unit to receive the user alias of another subscriber user conducting a voice call. Both Motorola and L3Harris have non standard deployments. MSI has declined standardization. Draft documents describing the L3Harris method have been distributed for review.
- Addendums for FDMA Trunking documents will be considered first followed by TDMA trunking. **FDMA documents have been published.**

Project 25 Standards TR-8 Update



TR-8.10

- Work on an addendum to the Trunking Control Channel Messages and Procedures document is in progress

The proposal is to specify one of the currently unused bits in the Emergency Alarm Request message. This flag is intended for use when a subscriber user is in an emergency situation and is unable to initiate an alarm request. For example, a trapped firefighter may not be able to initiate an alarm request, and remotely activating an emergency on their subscriber unit may facilitate their rescue. This emergency alarm special information field will inform other users of this situation.

- Comments have been received and author responses have been provided. A submission on control channel messages to activate this bit is expected.

Project 25 Standards TR-8 Update



TR-8.19

- Group Regrouping for the Trunking ISSI/CSSI Standard is in progress.

This work will enable dispatch equipment connected to Trunking Infrastructures via the ISSI/CSSI to control group regrouping services. Note the control channel messaging for these services has already been standardized.

- An updated draft of the Messages and Procedures document with companion Message Sequence documents is under review. Comments were received from Etherstack and L3Harris. Compiled comments with author responses have been distributed. Offline comment resolution discussions is in progress.
- ISSI Interoperability Test Procedures for Trunked Voice Operation Involving the ISSI
This effort will address errata collected since the last publication. These modifications will also consider tests for vocoder mode combinations.
- **Digital Fixed Station Interface addendum for interfacing with a 3GPP IWF is in progress.**
This effort will describe how a Conventional Fixed Station or Fixed Station Host may be used with an IWF
 - **A first draft has been distributed and comment resolution is in progress.**

Project 25 Standards TR-8 Update



ISSI TG

- Work is resuming for completion of the ISSI Interoperability Test for Trunked Supplementary Data.
This resumes work on the last ISSITG draft (2018) and will add emergency alarm cancel and group emergency cancel tests.
 - Previous comment resolutions were proposed and a revision was provided. Comments on the revision were submitted and include a proposal to review Emergency Cancel procedures in existing standards.
 - Comment resolution for comments not associated with Emergency Cancel are in progress.
 - Review of Emergency Cancel procedures in existing standards is complete and draft revisions are pending
- Work is resuming for completion of the ISSI Conformance Test for Trunked Supplementary Data

ATIS/TIA JLMRLTE Working Group Status



JLMRLTE

- The 2022 work on the JLMRLTE study is considered Phase 5 of the study document

This work included cleanup of material on common P25 trunking standard services, consideration of common P25 conventional standard services and consideration of common Analog conventional FM standard services.

- JLMRLTE calls have been held approximately every month
- The Phase 5 version of the study document is complete and has been distributed to TIA.
- Phase 6 scope is dependent on submissions.
- Study publication is TBD.
- **Calls were held July 12 and August 17. 8 and 9 submissions (respectively) that made editorial clarifications in section 5.**
- **Next calls are scheduled for September 5 and October 16.**

P25 Standards Update & JLMRLTE (LMR-LTE) Interworking Update.

Questions ??



Andy Davis

Chair of the TIA TR-8 Mobile and Personal Private Radio Engineering
Committee



PTIG Panel Presentation APCO 2023

P25 Standards Update and Future Projects

JLMRLTE (LMR-LTE) Interworking Update

Andy Davis

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P25/TIA Document Types

- **To date, TIA TR-8 (Mobile and Private Radio Engineering Committee) has created and maintains all documents included in the P25 Suite of Standards (80+ documents)**
 - FDMA and TDMA air interfaces
 - Trunking and conventional voice and packet data services
 - ISSI, CSSI and Fixed Station wireline interfaces
 - Security services
 - Tier 1 and Tier 2 Location services
- **Standards enable interoperability between equipment of different manufacturers**
 - User agencies (via User Needs Working Group (UNWG)) and/or customer Request for Proposals (RFPs) identify interfaces and functionality that need to interoperate
 - Manufacturer and user agency representatives work together to create TIA standard documents
 - Project 25 Steering Committee approves TIA standards for inclusion in the P25 Suite of Standards
 - Customers choose what standard functionality they desire, manufacturers build to the standards that support their customers, standard tests validate interoperability of independent implementations by different manufacturers

P25/TIA Document Types (cont.)

- **Standard messages and procedures documents**
 - Explain how standard services/features work
 - Message content and exchange procedures
 - Enable interoperable implementations by equipment manufacturers
- **Standard test documents**
 - Performance, conformance and interoperability
 - Standard test methods ensure implementations interoperate and comply with standard messages and procedures with specific configurations
- **Telecommunications Systems Bulletins**
 - Provide overviews of standard interfaces and standard services
 - Provide consistent methods for modeling coverage and interference and for validating coverage

Summary of Improvements and Ongoing Work for; P25 Air Interface Standards



- **New Radio Measurements Methods and Performance Recommendations for mobile/portable receiver interference rejection**
 - *Should interference from broadband base station signals occur, these set expectations on what interference protection may be reasonably expected from P25 and Analog mobile and portable receivers.*
- **Improving documentation for modeling noise and interference and for coverage modeling and verification**
 - *Now addresses interference issues for radios in proximity of short-tower cellular systems at 700/800 MHz, RF penetration through low-emittance (so-called "green") glass and additional factors for Coverage Acceptance Plans (CATPs).*

Summary of Improvements and Ongoing Work for; P25 Air Interface Standards



- **New Emergency Alarm indication for Trunking and Conventional**
 - *This indication is intended for use when a subscriber user is in an emergency situation and is unable to initiate an alarm request (example; trapped firefighter) and an alarm is remotely activated. This emergency alarm special information field will inform other users of this situation. Document pending TIA ballot.*
- **New User Alias Download feature for Trunking**
 - *Allows radios to translate the standard defined numeric identities received during voice calls to a system operator defined alpha numeric alias to improve the radio operator's awareness of who they are listening to in a call. Document pending TIA publication.*
- **New Location on Push to Talk feature for Trunking**
 - *Document in comment resolution, pending TIA ballot.*

Summary of Improvements and Ongoing Work for; P25 Security Standards



- **New NIST approved Over the Air Rekeying Message Authentication method**
 - *This adds a new standard MAC method for interoperability of new equipment while maintaining the previously standardized CBC MAC method for interoperability with legacy equipment.*
- **Improved Interoperability for End to End Encryption key sharing between Key Management Facilities (KMFs)**
 - *Manufacturer testing revealed differing interpretations of the use of S/MIME that are being clarified to prevent future interoperability issues.*

Summary of Improvements and Ongoing Work for; P25 Security Standards



- **New capabilities for P25 Key Fill Devices**
 - *The published standard enables interoperability of Key Fill devices when used for key management of portables/mobiles. New capabilities will allow interoperability of these devices when moving End to End keys between KMFs or KFDs, moving keys from KMFs to portables/mobiles and synchronizing Authentication keys between Authentication Facilities and portables/mobiles.*
- **New P25 Link Layer (Air Interface) Encryption service protecting all air interface signaling**
 - *Users and manufacturers are working together in the APCO Project 25 Interface Committee's Encryption Task Group. This new system level service will affect nearly all published Air Interface standards in addition to published Security and Wireline Interface standards. Multiple ETG documents define operation of the overall service. These are likely to move to TIA by the end of 2023 for standard revision work.*

Summary of Improvements and Ongoing Work for; P25 Wireline Interface Standards



- **Control of “Group Regrouping” across the Inter Sub System Interface (ISSI) and the Console Sub System Interface (CSSI)**
 - *Group Regrouping maximizes efficient use of RF resources when Talkgroups are patched together. Both the Motorola and L3Harris methods of Air Interface signaling are included in published Air Interface standards. This new work will enable control of the Air Interface signaling when systems are connected with an ISSI or have dispatch equipment connected with a CSSI.*
- **New Interoperability and Conformance tests for ISSI and CSSI**
 - *New Trunking Interoperability tests include tests for vocoder mode combinations, tests for Supplementary Data Services such as Call Alert, Emergency Alarm, Emergency Group Call Cancel, etc.*
 - *New Conformance tests will cover Supplementary Data Services.*

Summary of Improvements and Ongoing Work for; P25 Wireline Interface Standards



- **Modifications to the P25 Inter Sub System Interface (ISSI), the Console Sub System Interface (CSSI) and Digital Fixed Station Interface (DFSI) to enable future Interworking with Broadband Cellular Public Safety Systems**
 - *Published: ISSI/CSSI addendums defining use of the P25 ISSI/CSSI for connecting P25 Trunking systems to a 3GPP Interworking Function (IWF).*
 - *In review: DFSI addendum defining use of the P25 DFSI for connecting P25 Conventional or Analog FM base stations to a 3GPP IWF.*
 - *Pending: Revision or addendum to the P25 Conventional ISSI/CSSI standard for connecting P25 Conventional or Analog FM base stations to a 3GPP IWF.*

ATIS/TIA JLMRLTE Working Group

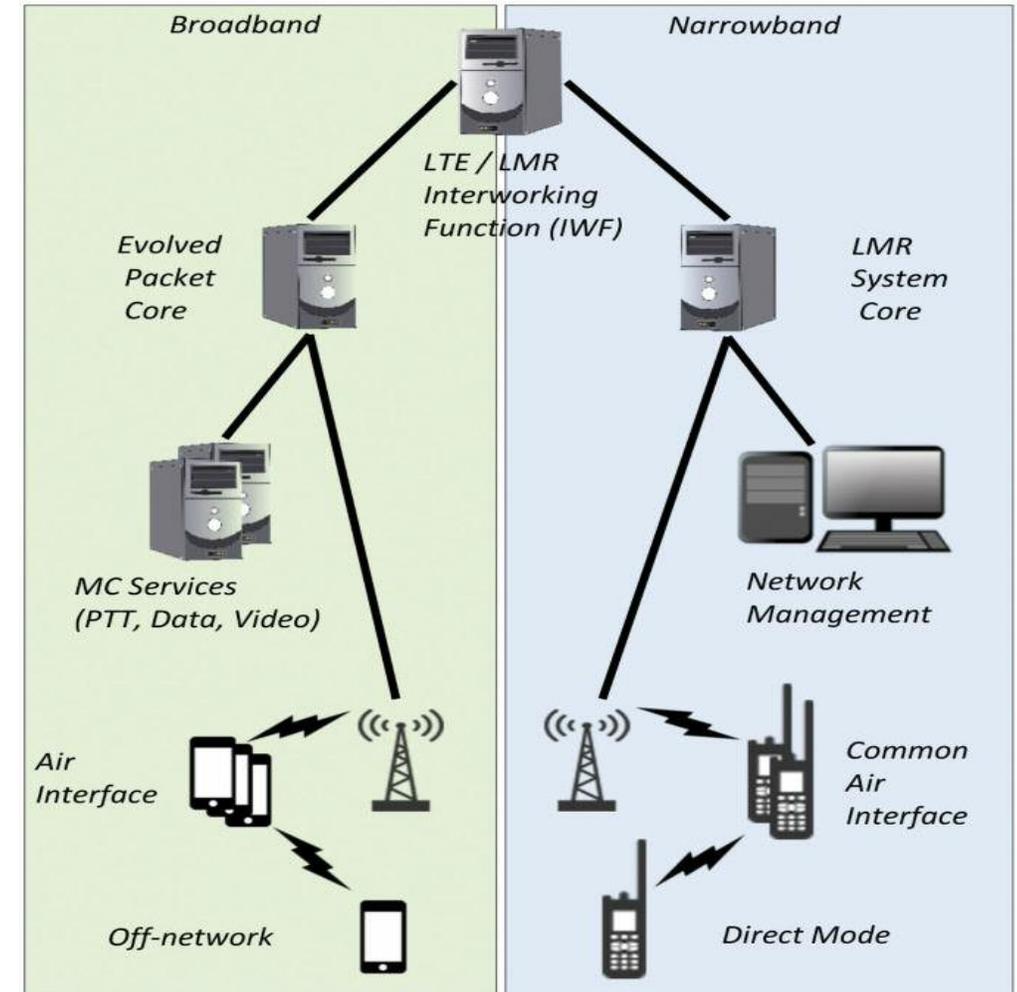


- The current JLMRLTE work item is titled the “Study of Interworking between P25 LMR and 3GPP (MCPTT) Mission Critical Services.”
- This document contains scenarios and considerations for the use of a 3GPP Release 15 interworking function (IWF) to enable interoperability of services between a 3GPP mission-critical standards based LTE system and a TIA standards based LMR system. TIA standards based LMR systems being considered are: P25/TIA-102 Trunking, P25/TIA-102 Conventional, and TIA-603 analog conventional FM.
- The study document includes P25 and Analog FM features that have similar 3GPP features and describes how they may be expected to interwork.
 - This enables 3GPP or TIA work to define the necessary messages and procedures to enable interoperable implementations.
- The study document also identifies P25 features that do not have similar 3GPP features and may not be expected to interoperate.
- Publication of the Study document by ATIS is TBD.

LTE/LMR Inter Working Function



- The 3GPP Interworking architecture defines an interworking functional entity (IWF).
- From the 3GPP side, the IWF acts as another mission-critical system, and from the LMR side, the IWF acts as another LMR system.
- The IWF is the functional entity responsible for conversion of media, identities and control signaling between LTE and LMR technologies to enable interoperable services.
- This IWF supports interworking between LMR systems and LTE systems using standard TIA LMR interfaces and the standard 3GPP IWF interfaces.
- For LMR, the P25 Inter-RF Subsystem Interface (ISSI/CSSI) and Digital Fixed Station Interface (DFSI) have been chosen by TIA.



LTE/LMR Interworking Summary



- The rollout of 3GPP LTE services is in progress and is expected to continue to progress in the coming years.
- There will likely be an extended period of time where both technologies exist in the market.
 - This period of co-existing technologies creates a need for Interworking of these technologies during the period of co-existence.
- The joint ATIS/TIA working group will continue to expand content of the study document to enable interworking of the technologies and migration to the LTE technology.
- Work will continue in TIA to maintain and update the P25 standard services.
- Work will continue in 3GPP to maintain and update the 3GPP LTE standard services.



THANK YOU!



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