PROJECT 25 TDMA TRUNKING SUITE OF TIA-102 STANDARDS

STATUS: P25 TDMA TRUNKING STANDARD COMPLETE

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PROJECT 25 TDMA TRUNKING

The TIA-102 suite of standards are used for the design and manufacture of interoperable Project 25 communications products for mission critical operations. P25 has gained worldwide acceptance for public safety and public service in addition to many other industries such as utilities, airports, transit, petroleum and chemical companies.

The Common-Air-Interface (CAI) is one of the most widely deployed Project 25 interfaces enabling interoperable communications between P25 radios and between P25 radios and P25 infrastructure regardless of the manufacturer. The P25 TDMA trunking suite of standards adds TDMA voice service to the existing P25 FDMA trunking voice and packet data services already defined.

P25 TDMA capable systems will use the P25 FDMA control channel for both FDMA and TDMA call requests. This allows systems to support FDMA calls as well as TDMA calls.

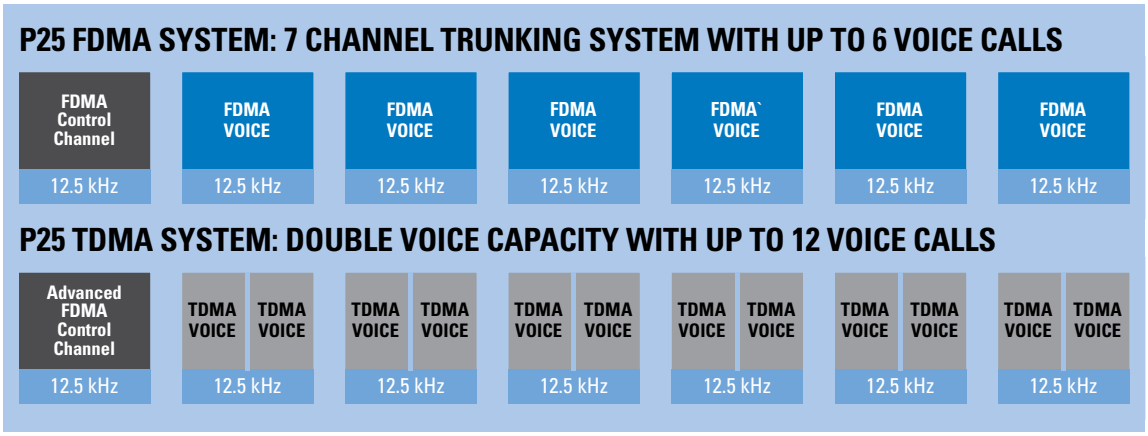
P25 TDMA capable systems will also use FDMA packet data service to support P25 OTAR, P25 Location service, POP25 (OTAP) and text messaging. It is therefore important that P25 TDMA capable system continue to support P25 FDMA features and operation.

P25 TDMA trunking operation meets the 2013 FCC equipment certification requirement for 6.25 kHz channel equivalence mode in UHF and VHF bands and the 2015 FCC equipment certification requirement for 6.25 kHz equivalence mode in 700 MHz band plans. It will also meet the 6.25 kHz channel equivalence 2017 FCC regulatory requirement for operation in the 700 MHz band plans.

P25 TDMA provides organizations flexibility in how they leverage their current frequency allocations. A 7 channel system implementing P25 TDMA could double system capacity or it could keep the voice capacity the same and free up channels for data operations.

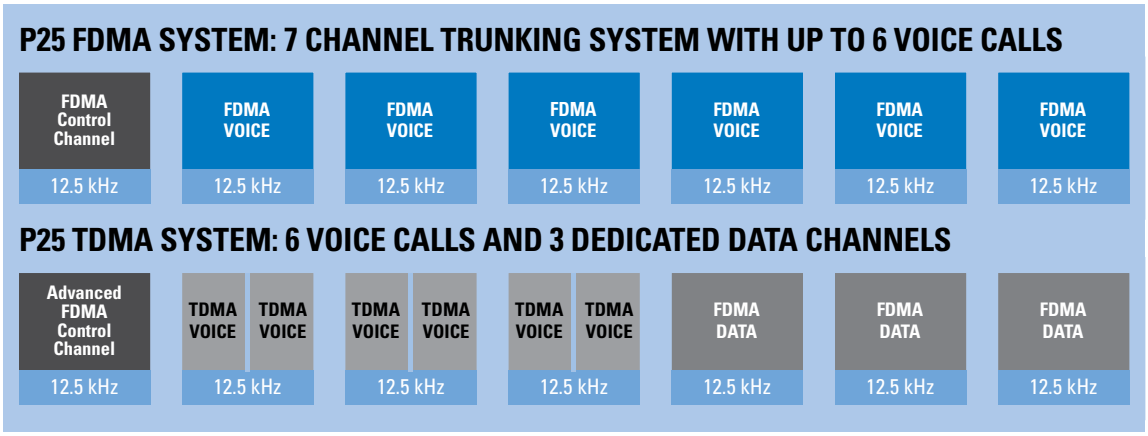
The P25 TDMA Common Air Interface is an addition to the P25 Standard and does not replace the P25 FDMA Common Air Interface.

USE CASE: INCREASED VOICE CAPACITY WITH TDMA



Organizations utilizing a P25 trunking system with TDMA operation can double their voice capacity. They go from having up to 6 simultaneous voice calls using P25 FDMA trunking operation to the ability to have up to 12 simultaneous voice calls using P25 TDMA trunking operation.

USE CASE: SAME VOICE CAPACITY PLUS ADDITIONAL DATA CAPACITY WITH TDMA



Organizations can use the additional system capacity afforded by P25 TDMA Trunking operation to maintain the same number of simultaneous voice calls and add data channels providing advanced data functionality such as OTAR, location service, OTAP, and text messaging.

P25 TDMA TRUNKING CORE DEFINITION AND TESTING DOCUMENTS COMPLETE

COMPLETION OF THE P25 TDMA TRUNKING STANDARD ENABLES DEVELOPMENT, TESTING AND IMPLEMENTATION OF INTEROPERABLE P25 TDMA TRUNKING EQUIPMENT

TDMA Trunking TIA-102 standards documents can be segmented into two main categories:

The Core Definition Documents are those TIA-102 Standards documents that enable manufacturers to develop and implement interoperable P25 TDMA trunking equipment.

The Testing TIA-102 Documents are used by manufacturers to verify that their product implementation adheres to the TDMA Trunking Core Definition Documents.

STATUS OF THE TDMA TRUNKING SUITE OF TIA STANDARD DOCS

CORE DEFINITION DOCS USED TO ENABLE DEVELOPMENT	2008	2009	2010	2011 (1H)	2011 (AUG)
TDMA Physical Layer Doc		PUBLISHED			
TDMA CAI MAC Layer Doc			PUBLISHED		
Control Channel Updates	PUBLISHED				
Encryption Updates		PUBLISHED			
Half-Rate Vocoder Annex		PUBLISHED			
TESTING DOCS USED TO VERIFY IMPLEMENTATION	2008	2009	2010	2011 (1H)	2011 (2H)
TDMA CAI Conformance Tests					APPROVED FOR TIA PUBLICATION
TDMA M&P Conformance Tests				APPROVED FOR TIA PUBLICATION	
TDMA Transcvr Msmt Methods					APPROVED FOR TIA PUBLICATION
TDMA Interoperability Tests				APPROVED FOR TIA PUBLICATION	
TDMA Transcvr Perf Recomnds					APPROVED FOR TIA PUBLICATION

APPROVAL STEPS FOR TIA/PROJECT 25

STEP 1

APPROVAL TO MOVE TO TR-8

A document has been sent to the appropriate TR-8 subcommittee to determine if additional work is required or if it is suitable for ballot. Once the document is balloted and approved, it will move onto the next stage: "Approved for TIA Publication". Motorola estimates it may take up to six months to advance to Step 3.

STEP 2

APPROVED FOR TIA PUBLICATION

A document is determined to be complete. The chair of the TR-8 subcommittee forwards the document onto TIA for publication. Motorola estimates it takes approximately one month to move to Step 3.

STEP 3

PUBLISHED BY TIA

A document is published as a TIA-102 standard document.

CORE DEFINITION DOCUMENTS ENABLE DEVELOPMENT

The Core Definition Documents are those documents that enable the development of P25 TDMA trunking interoperable equipment. The documents include the following:

Project 25 Phase 2 Two-Slot Time Division Multiple Access Physical Layer Protocol Specification Standard (TDMA Physical Layer Doc) standardizes modulation and data rate for P25 TDMA operation in a 12.5 kHz channel. Published in July 2009. TIA-102. BBAB.

Project 25 Phase 2 Two-Slot Time Division Multiple Access Media Access Control Layer Protocol Specification – Trunked Voice Services (TDMA CAI MAC Layer Doc) standardizes protocol, messages, and procedures for the P25 TDMA air interface.
Published in December 2010. TIA-102. BBAC

Control Channel Updates standardizes control channel messages and procedures to enable P25 TDMA radio registration and call assignment. Published November 2009. TIA-102. AABC-C.

Encryption Updates standardizes voice/data encryption synchronization on a P25 TDMA channel. Published August 2009. TIA-102. AAAD-A.

Half Rate Vocoder Annex defines lower bit-rate vocoder for the higher spectral efficiency of a TDMA air interface.
Published 2009. TIA-102.BABA-1.

The P25 TDMA Trunking Core Definition documents are now published.

Manufacturers now have the information necessary to build and verify interoperable P25 TDMA trunking equipment.

TESTING DOCUMENTS VERIFY IMPLEMENTATION

The Testing Documents enable manufacturers to verify implementation P25 TDMA Trunking operations. The documents include the following:

Project 25 Phase 2 Two-Slot Time Division Common Air Interface Conformance Tests (TDMA CAI Conformance Tests) are the standard MAC protocol tests. TIA-102.BCAD

Project 25 Phase 2 Two-Slot Time Division Messages and Procedures Conformance Tests (TDMA M & P Conformance Tests) are the standard MAC messages and procedures tests. TIA-102.BCAE

Project 25 Phase 2 Two-Slot Time Division Transceiver Measurement Methods (TDMA Transcvr Msmt Methods) are the standardized test methods for measuring transmitter and receiver performance. TIA-102.CCAA.

Project 25 Phase 2 Two-Slot Time Division Interoperability Tests (TDMA Interoperability Tests) are the standard tests for interoperability between radios and infrastructure. Addendum to TIA-102.CABC.

Project 25 Phase 2 Two-Slot Time Division Transceiver Performance Recommendations (TDMA Transcvr Perf Recomnds) are the standardized performance specs for the transmitter and receiver measurement methods. TIA-102.CCAB.

The P25 TDMA Trunking Testing documents are now approved for TIA publication.

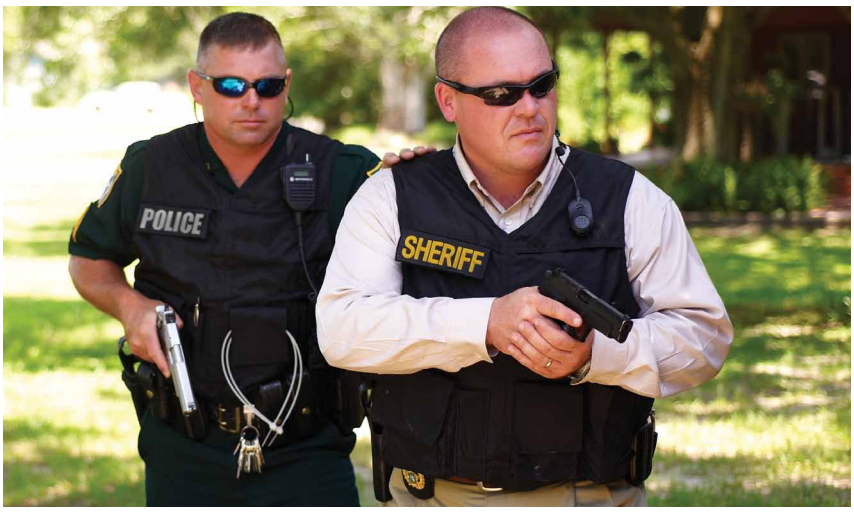
MOTOROLA IMPLEMENTS THE STANDARDS

Project 25 TDMA trunking is available on ASTRO 25 Release 7.11.
Agencies looking to purchase a P25 system can purchase an ASTRO 25 system with P25 TDMA trunking functionality designed to the TIA-102 Suite of Standards.

As of August 2011, Motorola has 16 contracts for Project 25 TDMA trunking systems.

Project 25 TDMA trunking is an optional feature available now on ASTRO 25 system release 7.11. In support of the standard, Motorola has already implemented enhancements specified in the P25 TDMA TIA-102 core documents such as the dual rate vocoder in the APX™ subscriber portfolio and the MCC 7500 console. Key systems components in ASTRO 25, like G-series products (stations, controllers, comparators) and the MCC 7500 console, are software upgradeable to TDMA.

Communication between P25 TDMA and P25 FDMA resources is a key priority of Project 25. In addition to the basic communication between P25 TDMA and P25 FDMA resources outlined by Project 25, Motorola offers Dynamic Dual Mode, which enables improved ease of use and system operation. With Dynamic Dual Mode, calls in an ASTRO 25 system are dynamically assigned as FDMA or TDMA depending on the resources that participate in a call. When all the resources (stations, subscribers) in a call are TDMA capable the call is processed as a TDMA call. If any of the resources is only capable of FDMA then the call is processed as a FDMA call. The call assignment through Dynamic Dual Mode is part of the core call processing application and is transparent to users and requires no intervention from users or network operators.



ADDITIONAL INFORMATION

Glossary of Terms

P25 – Project 25
TIA – Telecommunication Industry Association
TIA-102 – TIA Standards Document issued by TIA
TDMA – Time Division Multiple Access
FDMA – Frequency Division Multiple Access
CAI – Common Air Interface
MAC – Media Access Control Layer
FCC – Federal Communications Commission
HCPM – Harmonized Continuous Phase Modulation
HDQPSK – Harmonized Differential Quadrature Phase Shift Keying

Project 25 Information Sources

- Project 25 Technology Interest Group (PTIG) www.project25.org
- TIA (Telecommunication Industry Association) www.tiaonline.org/standards/
- Motorola Project 25 Website www.motorola.com/project25
- Motorola White Paper Project 25 Standard, Interoperable Communications for Public Safety Agencies
- Motorola Webinar Join the Project 25 Webinar Now

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