Project 25 Compliance

This document describes the current status of the National Institute of Standards and Technology (NIST) program for certifying Project 25 equipment, Motorola's plans to participate, and the scope of Project 25 compliance testing.

ASTRO 25 infrastructure and subscriber products from Motorola are designed and manufactured in accordance with P25/TIA-102 Standard documents to be compliant with Project 25 Standard mandatory and standardized-option features. By P25 definition, a 'compliant P25 product' infers that the product (base station, mobile and portable) has been successfully tested for specific P25 features and services, where the test cases are performed according to protocols published in P25/TIA-102 Standard documents and the testing is performed by a NIST recognized P25 test laboratory.

P25 marketplace experience has shown that even with many P25/TIA-102 Standard documents, manufacturers can interpret the written standards differently. This led to early interoperability issues between some of the P25 manufacturers. The US Congress called for, and appropriated funds for, a formal testing program which is now referred to as the P25 Compliance Assessment Program (P25 CAP). This program is currently being put into place by the Compliance Assessment Processes and Procedures Task Group (CAPPTG) which is part of P25/TIA, the P25 Steering Committee, Department of Homeland Security (DHS) and the National Institute of Science and Technology - Office of Law Enforcement Standards (NIST-OLES), Institute of Telecommunication Sciences (ITS) and the P25 Manufacturers.

The P25 CAP is being put into place to establish a long term, institutionalized process that will verify the standardized interoperability of P25 equipment and systems in a fair and repeatable process. This program will enable the tested interoperability the marketplace is seeking. Motorola is an active supporter and leading participant in defining the P25 CAP.

P25 CAP testing by NIST Recognized P25 Test Laboratories is expected to begin in 2008. The P25 CAP process requires P25 Laboratories to be assessed for capability and process by professional assessors from NIST. The P25 CAP requires each P25 Laboratory be officially "recognized' by NIST before official testing of P25 product.

P25 CAP test coverage will continue to expand in the future. When this expansion is finished, there will be a set of published performance, conformance and interoperability tests, covering P25 mandatory and standardized-option features or services that are provided across the P25 Standard interfaces. The P25 CAP is expected to reduce the possibility of interoperability problems between manufacturers to near zero.

The new TIA TR-8 Committee, the TR-8.25 Compliance Assessment Committee, was established in January 2007 so that new documents defining P25 compliance for performance, conformance and interoperability testing will become part of the P25/TIA-102 Standard. The TR-8.25 Compliance Assessment Committee is also tasked with future interoperability disputes, whether from manufacturers or P25 users. The TR-8.25 committee is tasked with determining the root cause of the issue and assigning ownership of the issue resolution as well as tracking status. Committee Reports of the TR-8.25 Compliance Assessment committee can be found on the TIA website.

Motorola's ASTRO 25 equipment will be tested under the P25 CAP. Motorola will provide the Project 25 Supplier's Declaration of Compliance (P25 SDoC) as defined by, required by and described by the DHS–SAFECOM Grant Guidance for FY07 document. The P25 SDoC is a document deliverable from the P25 manufacturer and is required as part of the formal P25 Compliance Assessment Program. The SDoC will include information on what equipment was tested, where it was tested and which P25 features were included in the testing. These documents are not yet available as the formal testing programs have not yet begun.

The following information defines the current scope for P25 CAP testing. This testing includes the P25 Performance of the subscribers and base station, plus P25 Trunked Interoperability testing of services and features.

PERFORMANCE TESTING

P25 CAP testing will begin with the subscriber and base station performance tests. The performance test profile has been approved for publication as a Technical Service Bulletin (TSB) within TIA.

Four TSBs define the P25 Performance Testing profile for P25 CAP. The test profile for each TSB is listed below. (note: the TSB-102.XXXX nomenclature has not yet been assigned for each TSB by the TIA)

- TSB-102.XXXX Transceiver Performance; Conventional Mode Subscriber
  Test profile:

Subscriber Receiver Tests	Subscriber Transmitter Tests
Reference sensitivity	Unwanted Emissions: Adjacent Channel Power Ratio
Faded Reference Sensitivity	Transmitter Power and Encoder Attack Time
Signal Delay Spread Capability	Transmitter Throughput Delay
Adjacent Channel Rejection	Frequency Deviation for C4FM
Co-Channel Rejection	Modulation Fidelity
Spurious Response Rejection	Transient Frequency Behavior
Intermodulation Rejection	
Signal Displacement Bandwidth	
Late Entry Unsquelch Delay	
Receiver Throughput Delay	

- TSB-102.XXXX Conventional Mode Fixed Station Transciever Performance
  Test profile:

Conventional Station Receiver Tests	Conventional Station Transmitter Tests
Reference sensitivity	Unwanted Emissions: Adjacent Channel Power Ratio
Faded Reference Sensitivity	Transmitter Throughput Delay[1]
Adjacent Channel Rejection	Frequency Deviation for C4FM
Co-Channel Rejection	Modulation Fidelity
Spurious Response Rejection	Transient Frequency Behavior
Intermodulation Rejection	
Signal Displacement Bandwidth	
Late Entry Unsquelch Delay[1]	
Receiver Throughput Delay[1]	

[1]These tests apply to fixed stations which provide an audio (analog) output.

- TSB-102.XXXX Transceiver Performance; Trunking Mode Subscriber
  Test profile:

SU Receiver Tests	SU Transmitter Tests	Trunking SU Tests
Reference sensitivity	Unwanted Emissions: Adjacent Channel Power Ratio	Trunking Control Channel Slot Times
Faded Reference Sensitivity	Transmitter Power and Encoder Attack Time	Trunking Request Time (applies to infrastructure and SU and measurement method necessitates both trunking infrastructure and subscriber equipment)
Signal Delay Spread Capability	Transmitter Throughput Delay	Trunking Voice Access Time (applies to infrastructure and SU and measurement method necessitates both trunking infrastructure and subscriber equipment)
Adjacent Channel Rejection	Frequency Deviation for C4FM	Transmitter Time to Key on a Traffic Channel (applies to SU but measurement method necessitates both trunking infrastructure and subscriber equipment)
Co-Channel Rejection	Modulation Fidelity	
Spurious Response Rejection	Transient Frequency Behavior	
Intermodulation Rejection		
Signal Displacement Bandwidth		

- TSB-102.XXXX Trunked Mode Fixed Station Transceiver and Related Infrastructure Performance
  Test profile:

Trunking Station Receiver Tests	Trunking Station Transmitter Tests	Trunking Infrastructure Tests
Reference sensitivity	Unwanted Emissions: Adjacent Channel Power Ratio	Trunking Voice Access Time (applies to infrastructure and SU and measurement method necessitates both trunking infrastructure and subscriber equipment)
Faded Reference Sensitivity	Transmitter Throughput Delay[1]	Time to Grant (applies to infrastructure but measurement method necessitates both trunking infrastructure and subscriber equipment)
Adjacent Channel Rejection	Frequency Deviation for C4FM	
Co-Channel Rejection	Modulation Fidelity	
Spurious Response Rejection	Transient Frequency Behavior	
Intermodulation Rejection		
Signal Displacement Bandwidth		

[1]Applies to fixed stations which provide an audio (analog) input only.

The P25 CAP Performance Test Cases are defined in the following P25/TIA-102 Standard documents
- TIA-102.CAAA-B Digital C4FM/CQPSK Transceiver Measurement Methods
- TIA-102.CAAB-B Land Mobile Transceiver Recommendations Digital C4FM/CQPSK Modulation

P25 TRUNKED VOICE INTEROPERABILITY TESTING

P25 CAP will test trunked voice interoperability. Non-Motorola subscriber will be tested on Motorola infrastructure. The reverse test will also be done. Motorola subscribers will be tested on non-Motorola infrastructure.

One TSB defines the Trunked Interoperability Testing Profile for P25 CAP. The test profile for each TSB is listed below. The performance test profile has been approved for publication as a Technical Service Bulletin (TSB) within TIA. (note: the TSB-102.XXXX nomenclature has not yet been assigned for the TSB by the TIA)

- TSB-102.XXXX Trunked Interoperability
  Test profile:

Trunking Interoperability Tests
Full registration
Valid registration
Denied or refused registration
Unverified registration
Group voice call
Group call granted
Group call denied
Group call request queued
Unit-to-unit voice call
Unit-to-unit call with target availability check[2]
Unit-to-unit call without target availability check[2]
Unit-to-unit call with target availability check denied by target[2]
Unit-to-unit call queued with target availability check[2]
Unit-to-unit call queued without target availability check[2]
Unit-to-unit call denied
Broadcast voice call
Broadcast voice call
Affiliation
Radio permitted to affiliate with new group
Radio denied affiliation to new group
Announcement group call
Collection of talk groups receive call[1]
Emergency alarm
Emergency alarm[1]
Emergency group call
Emergency call[1]
Encryption
Call privacy for encrypted call[1]
Intra-Location Registration Area roaming
Idle radio

[1] if provided by the manufacturer

[2] The Fixed Network Equipment may support target availability check, no target availability check, or both.

The P25 CAP Interoperability test cases are defined in the following P25/TIA-102 Standard document
- TIA-102.CABC-A Project 25 Interoperability Testing for Voice Services in Trunked Systems