

## **What is P25 Compliance?**

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This paper is intended to explain different levels of compliance statements that may be used by customers or consultants when specifying an equipment purchase or used by manufacturers promoting equipment capabilities.

In general, “Project 25 (P25) compliance” is typically interpreted as: “adherence to the P25 standard”.

The P25 Standard is composed of over 80 documents that cover multiple interfaces, multiple services and multiple features associated with each interface or service. Therefore, questions or statements about compliance to the “P25 standard” are really too vague to provide the understanding typically desired by those asking the questions or making the statements. Questions or statements about any level of compliance are more effectively expressed in the context of a specific interface, a specific service or a specific feature that is covered by a published P25 standard document or in the context of a specific standard document. For example, the statement: “My equipment is P25 compliant” is difficult to correctly interpret because it does not identify any P25 standard interface or service or document or set of features. A better statement would be along the lines of: “My radio is compliant to the P25 FDMA Air Interface, Trunking service, Group Voice Call feature.”

Questions or statements about compliance can still be ambiguous even with a specific context (example; P25 FDMA Air Interface Trunking Group Voice Call). This is because “compliance” to a P25 interface, service, feature or a specific document is not defined by the P25 Statement of Requirements, or by published P25 standard documents or by the DHS OIC Compliance Assessment Program (CAP). (Note that the DHS OIC Compliance Assessment Program does define compliance to their program, i.e. CAP compliance.) To date, TIA creates, publishes and maintains all documents approved by the Project 25 Steering Committee to be part of the P25 Standard however, neither TIA nor the Project 25 Steering Committee govern “compliance” to those standards. Even when questions or statements about compliance are expressed in the specific context of a P25 interface, service or feature there are still varying levels of how compliance is assessed. Four levels of assessing compliance are commonly used and are discussed below. The P25 user and manufacturer community should use the four levels of compliance described below when referring to the requirements or capabilities of P25 products, features and services.

### **Compliance in the context of the P25 Statement of Requirements (SoR) document**

Compliance statements at this level mean functionality covered by the SoR has been implemented.

The P25 Statement of Requirements (SoR) document is created and maintained by P25 Steering Committee’s User Needs Subcommittee (UNS). Since its inception the Project 25 Suite of Standards has been based on Radio User requirements. Users remain an integral component to the ongoing standards process. It is the P25 User Needs Committee (UNS) in concert with the

Project 25 Steering Committee that leads this effort. The P25 SoR is not part of the P25 Standard. The SoR captures the UNS view of the interfaces, services, features, etc. that should be addressed by P25 standards and/or implemented in P25 systems and equipment. This document currently includes labels for every item intended to reflect a relative importance ranking (Mandatory, Standard Option, Standard Option-Required).

The P25 SoR drives P25 Standard creation and content. This document contains high level descriptions of functionality but does not include the specifications and technical definitions sufficient to enable interoperability among multiple manufacturers. The standard documents that are developed from the P25 SoR and are intended to enable that interoperability. While several P25 SoR items do trace to published standards there are a number of items which do not. Items in the P25 SoR that do not trace to published standards are either pending standard creation or are considered system or equipment capabilities.

For these reasons, compliance statements at this level mean the functionality described in the P25 SoR has been implemented but that implementation may or may not trace to published P25 standards and so, one manufacturer's implementation may or may not interoperate with another manufacturer's implementation of the same functionality.

### **Compliance in the context of a published P25 standard document**

Compliance statements at this level mean functionality has been implemented in accordance with a P25 Standard document or documents.

The P25 Standard currently enables interoperable implementation of the following interfaces:

- FDMA Common Air Interface
- TDMA Common Air Interface
- Data Host Network Interface
- Mobile Data Terminal Interface
- Inter Key Management Facility Interface
- Key Fill Interface
- Inter Sub System Interface
- Console Sub System Interface
- Conventional Fixed Station Interface

The P25 Standard also identifies a Telephone Network Interface and a Network Management Interface. The operation of these interfaces are defined by industry standard documentation outside the P25 Standard.

There are multiple P25 Standard Services such as Location, Encryption and Over the Air Key Management. Some of these standard services operate over multiple standard interfaces. There are also multiple standard features that operate over multiple standard interfaces. P25 standard documents describe the messages, procedures and protocols that enable interoperability when independently implemented by multiple manufacturers. Quite often, multiple standard documents are needed to enable interoperable implementations. For example, the FDMA Common Air Interface standard provides information on modulations and protocols. There are additional documents that describe how the FDMA Common Air Interface may be used for

Trunking or Conventional applications. Within Trunking and Conventional applications, there are multiple documents that describe voice or data operation. There are also multiple documents that describe the messages and procedures associated with a variety of features that may apply to voice or data operation in either the Trunking or Conventional applications. For the past 30 years P25 product and service providers have been using this robust library of technical documents to create P25 systems, products and services that meet Public safety's diverse user requirements and offer interoperability across different P25 systems and manufacturers.

The P25 Standard consists of over 80 individual documents. Thus the P25 Standard is more accurately referred to as the P25 Suite of Standards. The P25 Steering Committee determines which documents to include in the P25 Suite of Standards. To date, all documents included in the P25 Suite of Standards have been created by and are maintained by the Telecommunication Industry Association's TR-8 Mobile and Personal Private Radio Engineering Committee. These documents comprise the TIA-102 series of standard documents. An overview of the P25 TIA-102 Documentation Suite is described in the TIA Telecommunications Systems Bulletin: TSB - 102 document. At the time this paper was written, the current version of that document was TSB-102-C.

The P25 Suite of Standards are intended to enable interoperability between implementations of multiple manufacturers. Each manufacturer determines which P25 Interface(s), which P25 Service(s) and which P25 feature(s) to implement based on the market segment they serve. For example, some manufacturers may provide P25 Group Services but not Individual Services or clear voice without encrypted voice, etc. The P25 Suite of Standards do not require implementation of any particular P25 feature set or interface.

For these reasons, compliance statements in the context of a P25 Interface, Service or Feature means that some aspect of that P25 Interface, Service or Feature is required or has been implemented according to the published standard. Compliance statements in the context of a specific P25 document means that some services or features covered by that document are required or have been implemented according to that document. To avoid misunderstandings and/or missed expectations, it is best to identify the specific interface, service and feature of interest and to identify the relevant P25 standards when asking questions about this level of compliance or when making statements about this level of compliance.

### **Compliance in the context of a published P25 standard TEST document**

Compliance statements at this level means functionality has been implemented per a P25 Standard document and has passed P25 standard tests associated with that functionality.

The P25 Suite of Standards also includes three types of standard test documents:

- Performance Test standards describe methods of measurement for important performance aspects of a P25 interface and recommended performance limits.
- Conformance Test standards describe methods for capturing and evaluating whether standard messages (defined by the P25 Standards ) are exchanged in the proper order and contain the proper content in the context of specific standard features associated with a specific standard interface.

- Interoperability test standards describe the expected behavior of specific features associated with a specific interface under specific operating conditions. This testing typically documents successful interoperability between infrastructure and subscriber units from multiple manufacturers.

These documents are used to verify an implementation of specific standard messages, procedures and protocols. The purpose of standard test documents is to ensure consistent testing methods are used and to ensure consistent meaning of test success or failure.

Compliance statements in the context of a specific standard test document, or better yet a specific set of tests from specific documents mean that the implementation of specific standard feature(s) associated with a specific standard interface have been verified.

### **Compliance in the context of the DHS OIC Compliance Assessment Program (CAP)**

The DHS OIC Compliance Assessment Program identifies equipment tests that may or may not be included in the P25 suite of standards. When CAP testing uses tests included in the P25 suite of standards, then compliance statements at this level means the tested functionality has been implemented per a P25 Standard document (or documents) and this functionality has passed its associated P25 standard tests that are included in CAP Compliance Assessment Bulletins (CABs) and the testing was performed in CAP recognized labs and the test results are reported in a CAP approved document.

The Department of Homeland Security (DHS) Office of Interoperability and Compatibility (OIC) operates the Compliance Assessment Program (CAP). While P25, TIA and CAP work together for a common cause, the DHS OIC CAP is administered independently of P25 and TIA. Manufacturer participation in the Compliance Assessment Program is voluntary and is governed by Compliance Assessment Bulletins (CABs) published by CAP which identify:

- Requirements for test lab recognition
  - Tests for certain P25 Interfaces, Services and Features that are to be run in recognized test labs (if implemented)
  - Reporting methods for test results obtained in recognized test labs
  - Functionality that equipment must implement in order to participate in the voluntary program
- When the tests identified by CAP are executed in a laboratory that is recognized by CAP and the test results are documented and formatted as defined by CAP, the equipment is said to be “CAP compliant.