Is Project 25 "Public Safety Grade"?

Project 25 Technology Interest Group, March 2016

Question: Is Project 25 "Public Safety Grade"?

The Answer: Yes!!

In simple terms, Public Safety Grade (PSG) equipment, systems or networks are those that provide the communication capabilities required by the operators and users of the equipment with availability and reliability exceeding that typically provided by commercial communication equipment, systems and networks. Project 25 in many ways establishes the foundation for implementing Public Safety Grade systems and equipment, and therefore we can say YES to the question "Is Project 25 Public Safety Grade?" The full discussion in this document provides comprehensive support for that answer.

Background

In response to the release of the National Public Safety Telecommunications Council paper titled:
"***Defining Public Safety Grade Systems and Facilities***", The Project 25 Technology Interest Group (PTIG) was approached with questions such as:
"Is Project 25 Public Safety Grade?" and
"What does "Public Safety Grade" mean in 100 words or less?"
The resulting discussions among the manufacturers, technologists and Public Safety Communication Agency user representatives within the Project 25 Technology Interest Group revealed that coming up with a single and concise answer, that everyone will accept, is a difficult task. As an aid to these types of discussions, this whitepaper highlights aspects of the Project 25 suite of standards that contribute to creating *Public Safety Grade* communications equipment, systems and networks.

By defining "Public Safety" as; the collection of Federal, State, Local and Tribal agencies tasked with keeping the public safe, it becomes apparent that the communication needs of these people are diverse and can be unique from the communication needs of the general public. In fact, depending on the respective missions and operating environments, the communication needs of one Public Safety agency can be quite different than the needs of another Public Safety agency.

Public Safety Communication Services

The Project 25 user community has identified a broad set of features and services that are important to Public Safety Communications. The suite of Project 25 standards defines the functional and operational aspects of these features and services. There are too many to list here but this includes several types of voice calls, IP and Common Air Interface data bearer services, control signaling services, mobility management services and location services. It also includes voice and data encryption and security services such as authentication, and key management services. Most services are available in both the Trunking and Conventional-operating mode.

Public Safety Communication Configurations

The suite of Project 25 standards defines a variety of interfaces intended to serve the diverse configuration needs of the Public Safety community. This includes Frequency Division Multiple Access (FDMA) and Time Division Multiple Access (TDMA) air interfaces for communication between radio and dispatcher equipment. Several wire line interfaces provide for connecting system components to form communication systems or for connecting systems into wide area communication networks. These interfaces enable the use of Public Safety features and services in a wide variety of configurations. These configurations range from direct simplex radio-to-radio communications to multi-band, multi-channel, multi-site, and statewide-networked configurations. This includes simulcast and voting configurations. These interfaces and configurations serve both Trunking and Conventional operating modes.

Public Safety Performance

In addition to meeting national and international government spectrum regulations, the suite of Project 25 standards defines additional performance requirements important for Public Safety communications. This includes coverage performance modeling and verification methods, receiver and transmitter performance measurement methods and specifications for both FDMA and TDMA air interfaces. Additionally, it includes voice service access and throughput delay specifications and measurement methods for radios, base stations and Trunking systems. Project 25 also defines a rigorous vocoder intelligibility and background noise performance evaluation process that has resulted in approval of interoperable full rate and half rate digital vocoders.

Public Safety Interoperability

Standards based interoperable communications has become a top requirement for the Public Safety community. The primary purpose of the suite of Project 25 standards is to enable interoperable implementation of the Project 25 features, services and interfaces by multiple manufacturers. As of this writing there are 35 manufacturers providing equipment or services that are designed to one or more aspects of the Project 25 standards. The suite of Project 25 standards includes test documents to ensure repeatable test results using consistent, industry approved test methods. These documents cover performance, message, procedure and protocol conformance testing as well as equipment interoperability testing for the Project 25 features, services and interfaces. Manufacturers, customers, or test labs may use these test documents. To date, all tests included in the Department of Homeland Security's Project 25 Compliance Assessment Program reference Project 25 test documents. This ensures interoperability between equipment produced by different manufacturers and between different Public Safety agencies.

Public Safety Grade

Project 25 equipment, systems and networks can be designed and configured to provide the features, services, interfaces, configurations, operating modes and performance required by Public Safety under conditions that commercial grade public communication equipment and systems are not designed or configured to support. Public Safety Grade communications is the

subject of the National Public Safety Telecommunications Council (NPSTC) paper published 5/22/14 and titled:
"*Defining Public Safety Grade Systems and Facilities*"
The Project 25 Technology Interest Group fully supports the content of the NPSTC report.

The NPSTC report covers a wide variety of topics and best practices that should be considered by anyone that is purchasing, installing, operating and maintaining communication equipment, systems and networks for use by Public Safety. The principles covered in this report are not unique to Project 25 equipment but the report was created by a variety of public safety, commercial, and industry participants all familiar with North American Public Safety Land Mobile Radio communication systems and equipment including, but not limited to, equipment and systems designed to the Project 25 Suite of Standards.

The following excerpts from the NPSTC report highlight the content and intent of that report:

"The term "Public Safety Grade" is a conceptual term that refers to the expectation of emergency response providers and practitioners that their equipment and systems will remain operational during and immediately following a major natural or manmade disaster on a local, regional, and nationwide basis."

"PSG communications systems are systems that are used by public safety responders and that have been evaluated by public safety officials to provide reliant and resilient operations in the event of natural or manmade disasters or events."

"Communications is vital to both public safety field and command personnel during routine, local incidents and even more so during major incidents covering a larger area. Public safety voice LMR networks today are among the most reliable networks available in the United States. Today's commercial wireless networks are not built to the same standard."

"Any system builder must carefully consider these best practices and requirements. It is acknowledged that some requirements and recommendations may be impossible to meet at a particular site while others may be economically impractical."

"The best practices and requirements provided in this document (the NPSTC document) are intended to address the steps necessary to make a communication site highly available, even in the event of a disaster. They are intended to capture the typical efforts of public safety network builders to "harden" their communication sites with the objective of achieving this high level of service availability."
"This report seeks to further define the phrase "Public Safety Grade" and to provide measurable characteristics which would differentiate a mission critical communications system from a standard or commercial grade network."

Summary

The Public Safety Community requires a wide variety of interoperable, standards based Communication Services, Configurations, and Capabilities with well-defined performance,

interoperability, and testing specifications. This is the essence of the Project 25 suite of standards as it relates to "Public Safety Grade" Communications Systems.

- A "Public Safety Grade" Communications Standard, first and foremost, provides a set of features capabilities and services required by the diverse group of Public Safety users.

- The Project 25 User Needs Sub-Committee (UNS) has defined those required features and the Project 25 Suite of Standards supports those features.

- Manufacturers take the features and specifications defined by the Project 25 Standard and implement them in reliable software, hosted on rugged hardware platforms that are exhaustively tested to meet the performance and interoperability specifications prescribed by the Project 25 Suite of Standards.

- These software and hardware platforms are then combined and implemented as a Project 25 System in a highly reliable, highly resilient manner, with, redundant elements, backup power, etc. These systems are designed to cover a specified geographic area with extra margin for coverage reliability. Equipment that is built to the Project 25 standards and has been tested to Project 25 standard tests and is installed, operated and maintained per the NPSTC document to the maximum extent practical; creates an interoperable "Public Safety Grade" communications system.

- Multi-vendor solutions enabling interoperability between devices, Public Safety individuals and groups, fleets, and teams that can be can be linked across local, regional, state and national networks exist; offering Public Safety agencies competition and options for cost effective sourcing.

- Public Safety practitioners have been doing this with the P25 Suite of Standards for close to 30 years and there are over 700 P25 systems in operation providing Public Safety Grade, life-saving communications for day to day operations as well as emergency situations.

- Thus, "Public Safety Grade" Project 25 is the foundation of North American Public Safety Communications and the cornerstone of many Public Safety Grade Systems around the world.

The P25 "user driven" technology approach continues to guide the decision making process for P25 technologists and engineers into the future. The result will be updates and improvements to existing Standards and the development of new P25 Standards that result in capability and performance improvements for Project 25 products and services.