

# **Project 25 Document Suite**

## **Reference**

**P25DSR**

October 29, 2007



## Publication Notice

---

---

### Abstract

This document tracks the current state of Project 25 standards documents. The Telecommunications Industry Association (TIA) TR8 Committee meets quarterly to develop, revise, and approve Project 25 standards documents. This document is updated soon after each TR8 Committee meeting to reflect Project 25 standards document progress.

### Disclaimer

This is a National Institute of Standards and Technology/Office of Law Enforcement Standards (NIST/OLES) sponsored document. This is not an Association of Public-Safety Communications Officials (APCO) Project 25 document.

### Contact Information

Please send questions or comments to: [P25DocRefEditor@its.bldrdoc.gov](mailto:P25DocRefEditor@its.bldrdoc.gov)

### Change Log

Date	Changes
October 2005	Initial document.
February 2006	Revised the document's heading hierarchy.
March 2006	Expanded document lists and decision chart graphics.
May 2006	Updated document lists and modified decision chart graphics. Removed the Project 25 Standards Classification Index tables as it was decided they added little value.
June 2006	Updated document lists and modified decision chart graphics.
October 2006	Updated document nomenclature and status.
April 2007	Following Oct 2006 Minneapolis meeting decisions, used the TR8 version of this document to create this agreed upon unified version, which includes estimated dates for unfinished documents. Added suggested "Note" to section 3 (page 7) clarifying that dates for unfinished documents are best-estimate targets. Removed yellow-highlighting from documents approved in April, and changed status to "Approved Apr 2007."
August 2007	Following Apr 2007 Dallas and Aug 2007 Baltimore TR8 meetings, addressed earlier comments regarding document dates and publications reference organization. Updated document lists and publication dates.

<b>Date</b>	<b>Changes</b>
October 2007	Removed version numbering for this document in favor of using only a revision date. Highlighted P25 document requirement levels. Added a new section introducing P25 interfaces. Edited section 1 and 3. Added “Project 25 Communications Resources” section. Added Disclaimer and Contact Information. Revised ISSI scope organization. Incorporated document updates.

# Contents

---



---

<b>1</b>	<b>Project 25 Document Suite</b> .....	<b>1</b>
1.1	Introduction .....	1
1.1.1	User Representative Steering Committee .....	1
1.1.2	Digital Modulation and Spectrum Efficiency Two-Phase Plan .....	1
1.1.3	Requirements Driven .....	2
1.2	Description and Specification Documents .....	2
1.3	Compliance Assessment Documents .....	2
1.4	Standards Completion .....	3
1.5	Project 25 Communications Resources .....	3
<b>2</b>	<b>Project 25 Interfaces and Legend for Standards</b> .....	<b>5</b>
2.1	Interfaces Described .....	6
2.2	Legend for P25 Standards Document Status .....	7
<b>3</b>	<b>Project 25 User Requirements and Standards Structure</b> .....	<b>9</b>
3.1	Project 25 Statement of Requirements .....	9
3.2	Project 25 System Description and Organization .....	9
<b>4</b>	<b>Suite of Standards for Project 25 Interfaces and Systems</b> .....	<b>11</b>
4.1	Common Air Interface .....	11
4.1.1	FDMA Conventional Digital—Phase 1 .....	11
4.1.2	FDMA Conventional Analog—Phase 1 .....	13
4.1.3	FDMA Trunked Digital—Phase 1 .....	13
4.1.4	TDMA Trunked Digital—Phase 2 .....	13
4.1.5	Vocoder .....	13
4.1.6	General CAI Documents .....	14
4.2	Inter-RF Subsystem Interface .....	15
4.2.1	Scope 1 – Voice Services .....	15
4.2.2	Scope 2 – Additional Project 25 Services .....	17
4.3	Fixed Station Subsystem Interface .....	18
4.4	Console Subsystem Interface .....	19
4.5	Subscriber Data Peripheral Interface and Data Interface .....	20
4.6	Network Management Interface .....	21
4.7	Telephone Interconnect Interface .....	22
<b>5</b>	<b>Suite of Standards for Project 25 Services</b> .....	<b>25</b>
5.1	Encryption Services .....	25
5.1.1	Advanced Encryption Standard .....	25
5.1.2	Data Encryption Standard .....	27
5.1.3	Key Fill Device .....	28
5.1.4	Over-the-Air Rekeying .....	29
5.2	Trunked Services .....	30
5.2.1	FDMA Trunked Digital—Phase 1 .....	30
5.2.2	Two-Slot TDMA Trunked Digital—Phase 2 .....	33
<b>6</b>	<b>Suite of Standards for Project 25 Equipment</b> .....	<b>35</b>
6.1	Analog FM Transceivers—Phase 1 .....	35
6.2	Digital Project 25 Phase 1 Transceivers .....	36
6.3	Digital Project 25 Phase 2 Transceivers .....	36
6.4	Mobile Radio Push-to-Talk and Audio Interface .....	37

6.5	Audio Tone Signaling .....	38
<b>7</b>	<b>Project 25 Decision Charts .....</b>	<b>39</b>
7.1	Project 25 Subscriber Equipment .....	40
7.2	Project 25 Repeaters .....	45
7.3	Project 25 Base and Fixed Stations .....	46
7.4	Project 25 Console .....	49
7.5	Project 25 Inter-RF Subsystem Interface .....	52
7.6	Project 25 Telephone Interconnect .....	53
7.7	Project 25 Network Management .....	54
7.8	Project 25 Data Network .....	55

## Tables

---

---

Table 1:	Legend for P25 Standards	7
Table 2:	Project 25 Statement of Requirements Documents	9
Table 3:	Project 25 System Description and Organization Documents	9
Table 4:	FDMA Conventional Digital Documents—Phase 1	11
Table 5:	Vocoder Documents	13
Table 6:	General Common Air Interface Documents	14
Table 7:	Inter-RF Subsystem Interface Documents, Scope 1 – Voice Services	15
Table 8:	Inter-RF Subsystem Interface Documents, Scope 2 – Additional P25 Services	17
Table 9:	Fixed Station Subsystem Interface Documents	18
Table 10:	Console Subsystem Interface Documents	19
Table 11:	Subscriber Data Peripheral Interface and Data Network Interface Documents	20
Table 12:	Network Management Interface Documents	21
Table 13:	Telephone Interconnect Interface Documents	22
Table 14:	Encryption – Advanced Encryption Standard Documents	25
Table 15:	Encryption – Data Encryption Standard Documents	27
Table 16:	Encryption – Key Fill Device Documents	28
Table 17:	Encryption – Over-the-Air Rekeying Documents	29
Table 18:	FDMA Trunked Digital Documents—Phase 1	30
Table 19:	Two-Slot TDMA Digital Documents—Phase 2	33
Table 20:	Analog FM Transceiver Documents—Phase 1	35
Table 21:	Digital Phase 1 Transceiver Documents	36
Table 22:	Digital Phase 2 Transceiver Documents	36
Table 23:	Mobile Radio Push-to-Talk and Audio Interface Documents	37
Table 24:	Audio Tone Signaling Documents	38



---

---

# 1 Project 25 Document Suite

---

---

## 1.1 Introduction

Project 25 (P25) is a partnership between the public safety communications community and industry manufacturers whose goal is the publication of a suite of standards that enable the offering, procurement, and operation of interoperable digital two-way wireless communications products and systems that meet mission-critical needs of public safety practitioners. (Section 1.5 provides links to more information.)

The formal standards development process is conducted by the Mobile and Personal Private Radio Standards Committee (TIA TR-8) of the Telecommunications Industry Association's (TIA) Standards and Technology Department. TIA is accredited by the American National Standards Institute (ANSI) to develop voluntary industry standards for a wide variety of telecommunications products.

Project 25 is unique in that it is a user-driven process to develop a family of public safety communications standards for which the requirements have been defined by state, local and federal government users.

### 1.1.1 User Representative Steering Committee

Project 25 is directed by a steering committee composed of user representatives from federal agencies, state governments, and local governments. All activities of the P 25 process must be approved by the steering committee and TIA in accordance with the Memorandum of Understanding (MoU) consummated in 1993. Members of the public safety community attend regular meetings of the APCO Project 25 Interface Committee (APIC), which was established under the MoU to facilitate TIA's development standards that can be adopted as part of the P25 standards suite.

### 1.1.2 Digital Modulation and Spectrum Efficiency Two-Phase Plan

Project 25 represents the public safety community's overall strategy to develop a digital modulation solution and achieve Federal Communications Commission (FCC) spectrum efficiency mandates calling for eventual migration to narrowband channel spacing in the VHF and UHF bands, which call for an eventual four-to-one reduction in spacing from 25 kHz to 6.25 kHz equivalent per voice channel.

Project 25 addresses the FCC's mandate with a two-phase plan.

- Phase 1 defines the necessary technologies to provide for channel reduction from 25 kHz to 12.5 kHz. Phase 1 refers to P25 requirements and standards for a digital common air interface (CAI) based on frequency division multiple access (FDMA) using a 12.5 kHz channel.
- Phase 2 defines an additional 50 percent reduction in channel size to 6.25 kHz or equivalency. Phase 2 refers to P25 requirements and standards for a digital CAI time division multiple access (TDMA) using a 6.25 kHz equivalent channel, two slots in a 12.5 kHz channel.

### 1.1.3 Requirements Driven

P25 standards are driven by a public safety user-defined *Statement of Requirements* and an over-all approach to the development of the standards via a *Project 25 System Description and Organization* document. The organization of the standards divides the suite into documents relating to P25 system interfaces, services, and equipment. Associated with each interface, service, and equipment section is a set of documents that does either of the following:

- Describe and specify the standards appropriate to the section.
- Describe tests to demonstrate compliance of the offered interface, service, and equipment to the standards.

## 1.2 Description and Specification Documents

Two types of documents are used to describe and specify the interface, service, or equipment: one type provides an overview, the other type defines the protocols.

- The Overview document describes the operation and functions associated with a standard, but it does not prescribe a standard. Thus, the overview document is considered *informative*. The overview document provides background relating to the *Project 25 Statement of Requirements*, shows its relationship to the overall P25 system model, and provides guidance to users, system designers, and manufacturers.
- The Protocol documents are considered *normative*. They provide the required messages, formats, and specifications necessary for the P25 interfaces, services, and equipment to be interoperable and meet the users' *Project 25 Statement of Requirements*.

## 1.3 Compliance Assessment Documents

To demonstrate compliance with the protocol specifications, a set of test documents is defined.

- The Conformance Tests Procedures documents test for conformance to the protocol specifications. This document would typically be used by the manufacturer to test the system component or service for assurance of conformance to the associated protocol documents.
- The Performance Measurements Methods documents and Performance Recommendations documents quantify service setup times, throughput delay times, bandwidths, co- and adjacent channel factors, etc. for a system component or service to ensure that the radio systems:
  - Conform to radio and network regulations
  - Behave as good neighbors to the systems of nearby agencies
  - Satisfy user performance requirements
- The Interoperability Test Procedures documents describe tests for operational equipment to assure users that equipment supplied by different manufacturers can indeed be trusted to interoperate under the conditions defined by the standards.

## 1.4 Standards Completion

For most cases, a P25 interface, service, or equipment standard is not complete until all documents that provide the Overview, the Protocol Specifications, the Protocol Conformance Test Procedures, the Performance Measurements Methods, the Performance Recommendations, and the Interoperability Test Procedures are published or are approved for publication by the appropriate TIA TR8.n committee.

However, because constant change is the nature of technology, standards are, in truth, never complete. Standards development is in fact, a living process. This is a practical result since there will be design improvements in the protocols, which will require changes to the protocol specifications (sometimes after products are developed or implemented). Similarly, the development of new technologies or the enactment of new regulations will cause users to modify their requirements, which results in new specification and testing standards. Thus, P25 standards will not remain fixed but will evolve with time and circumstances.

## 1.5 Project 25 Communications Resources

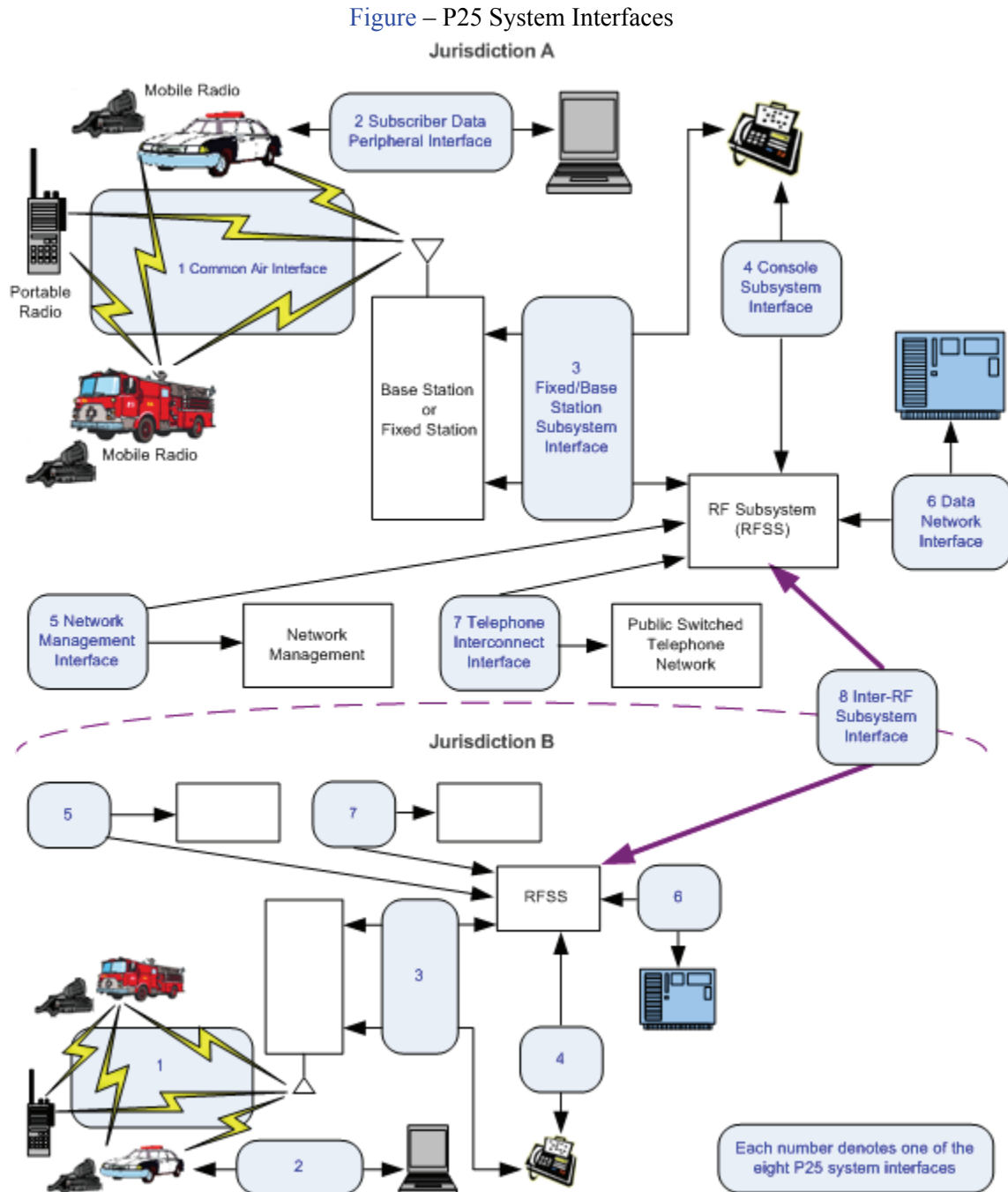
Many resources are available for learning more about Project 25, public safety communications interoperability, and how to procure a P25 system. Following are just a few places to start:

- Project 25
  - [http://www.tiaonline.org/standards/technology/project\\_25/](http://www.tiaonline.org/standards/technology/project_25/)
  - <http://www.project25.org/>
- Public safety communications interoperability
  - <http://www.safecomprogram.gov/SAFECOM/interoperability/default.htm>
- Procurement
  - <http://www.safecomprogram.gov/SAFECOM/library/grant/>
  - <http://www.safecomprogram.gov/NR/rdoonlyres/6AC5602E-7D8B-4416-9416-45F8ED257079/0/GuidelinesforRFPDevelopmentCW62806.pdf>



## 2 Project 25 Interfaces and Legend for Standards

The following figure identifies the eight P25 system interfaces. Section 2.1 describes each interface.



P25 interfaces enable interoperable voice and data communications between and among different public safety agencies. An example is communications between police and firefighters in a particular jurisdiction. A further example is communications among agencies in different jurisdictions, such as when incidents require the response of agencies from two or more jurisdictions. Standardized P25 interfaces are the “glue”

enabling interoperable mission-critical communications between and among radios and infrastructure equipment procured from different manufacturers that compose public safety P25 land mobile radio (LMR) networks.

## 2.1 Interfaces Described

Dividing the LMR network at defined interfaces lets manufacturers develop interoperable products specific to their areas of expertise. This frees users to buy products that meet their specific needs.

For example, a manufacturer might build fixed-location radios (identified as base station or fixed station), in which case the product must meet the requirements of two P25 interfaces (both the CAI and the FSSI; described in the next bullet list). In addition, that manufacturer might offer non-standardized, value-added features as an extension to their P25 fixed radio offering, such as operation over large temperature spans (ideal for radios on mountaintop locations in isolated areas). Such a feature might be very important to a particular user. In another scenario, a manufacturer might highlight pricing considerations by offering a functionally limited fixed radio that still satisfies all of the mandatory P25 interface requirements. Again, this may be appealing to users for some applications.

The goal is to provide users the ability to choose from various manufacturers' offerings to build out their P25 systems. P25-compliant equipment offerings must satisfy all mandatory and, as applicable, optional requirements. (These requirements are noted as Mandatory and Standard Option features in *Project 25 Statement of Requirements (SOR)*. See [Section 3.1.](#)) This way, users can be confident that their P25 systems will work across the interface with other P25-compliant equipment regardless of manufacturer.

Following is a description of each P25 interface.

- **Common Air Interface (CAI)**  
Enables wireless communication (voice and data) directly between P25 mobile and portable subscriber units (i.e., P25 radios) and between P25 mobile and portable subscriber units via a fixed/base station (and many times another radio, called a repeater, which is a component of the P25 equipment infrastructure).
- **Subscriber Data Peripheral Interface**  
Enables data to be transferred between a P25 radio and an external data device directly connected to the P25 radio.
- **Fixed/Base Station Subsystem Interface (FSSI)**  
Enables voice and control information to be transferred between an RF subsystem (RFSS) or console subsystem and a fixed/base station.
- **Console Subsystem Interface (CSSI)**  
Enables voice and control information to be transferred between an RFSS and a console subsystem (a console is equipment that a dispatcher or a supervisor uses to oversee and control mission critical voice communications among field personnel).
- **Network Management Interface**  
Enables administrators to comprehensively control and monitor P25 functional elements via RFSS connectivity.

- Data Network Interface  
Enables data to be communicated to/from external computers, data networks, data sources, etc., via RFSS connectivity.
- Telephone Interconnect Interface  
Enables field personnel to make connections through the public switched telephone network (PSTN) via RFSS connectivity by using their radios rather than, for example, using cellular telephones.
- Inter-RF Subsystem Interface (ISSI)  
Enables different manufacturers' RFSS equipment to interoperate, and includes support for roaming of P25 radio subscribers among different jurisdictions, agencies, cities, etc.

## 2.2 Legend for P25 Standards Document Status

Tables in this reference guide identify the most current documents related to the P25 suite of standards. Tables list each document's title, document number, publication date, and a brief description of the document's purpose by summarizing the document's topics in parenthesis. [Section 3](#) lists the documents that describe the P25 user requirements and the P25 standards structure. Sections [4](#) through [6](#) list the documents related to the P25 interfaces, services, and equipment. The documents are listed under two major divisions:

- Description and Specification Documents
- Compliance Assessment Documents

One or more TIA-published documents are identified with each category of Overview, Protocol, Conformance Test Procedures, Performance Measurement Methods, Performance Recommendations, and Interoperability Test Procedures. For some categories, a document is not necessary or appropriate and those will be identified with a “No documents are necessary or applicable” notation.

***Note: Yellow-highlighted documents are unpublished but are under development by the TR8 Committee. For each unpublished document, the TR8 Committee Chairs have supplied best-estimate target dates for release as an approved TR8 Committee document for publication and distribution by TIA. Be cautious of purchasing products without the benefit of published P25 standards.***

P25 documents are freely available to Federal, state, and local public safety agencies. All others may purchase the documents from <http://global.ihs.com/> by searching for TIA and P25 documents.

The following legend provides document identifier conventions.

**Table 1: Legend for P25 Standards**

<b>Item</b>	<b>Description</b>
<b>***-NNN.XXXX</b>	
Where *** Can be:	ANSI/TIA/EIA — a full standard TIA — A TIA-only standard (the current objective is to move TIA standards to full ANSI standards) TSB — A TIA Telecommunications Systems Bulletin that is not a standard but is useful to P25-compliant equipment manufacturers and users
Where NNN can be:	102 — P25 Phase 1 and some Phase 2 standards 905 — P25 Phase 2 902 — P25 wide band services in the 700 MHz band 603 — Analog FM equipment
Where XXXX can be:	Axxx — Services offered by P25 Bxxx — Systems defined by P25 Cxxx — Equipment performance measurement methods for P25
<b>Document Status</b>	
No documents currently under development	Documents might be planned, but are not yet under development
No documents planned	Documents might be necessary, but are not yet planned
No documents are necessary or applicable	Currently, no documents are necessary or applicable
<b>Task Groups</b>	
CAI TG	Common Air Interface Task Group
ISSI TG	Inter-RF Subsystem Interface Task Group
FSSI TG	Fixed Station Subsystem Task Group
CSSI TG	Console Task Group
FDMA TG	Frequency Division Multiple Access Task Group
TDMA TG	Time Division Multiple Access Task Group
DI TG	Data Interface Task Group
NMI TG	Network Management Interface Task Group
TII TG	Telephone Interconnect Interface Task Group
CAPP TG	Compliance Assessment Process and Procedures Task Group

## 3 Project 25 User Requirements and Standards Structure

### 3.1 Project 25 Statement of Requirements

Public safety communication system users are responsible for providing and maintaining their user needs in the form of a system requirements document. The Steering Committee, with the involvement of its Project 25 User Needs Subcommittee (P25 UNS), establishes the priorities and scope for technical development by TIA of new and revised P25 standards.

The P25 UNS' ongoing development of the Project 25 Statement of Requirements (P25 SOR), as approved by the Steering Committee, plays an essential role in not only developing standards that meet users' needs but also to establish the basis upon which equipment and systems can be assessed as being compliant with the P25 standards. The P25 SOR also establishes a feasible migration path for P25 equipment and systems to take advantage of emerging technologies. As a result, the P25 SOR establishes a balance between user needs and what industry is able to implement based on current physical, technological, and regulatory constraints. [Table 2](#) lists current P25 SOR documents.

**Table 2:** Project 25 Statement of Requirements Documents

<b>Documents</b>
<ul style="list-style-type: none"> <li>■ <i>Project 25 Statement of Requirements (SOR)</i>, (Mar 2006) (Project 25 Overview, Detailed Standards Suite Proposed [Common Air Interface, Data Interface, Inter-RF Subsystem Interface, Network Management Interface, Open Console Interface, and Open Fixed/Base Station Interface], P25 System Overview, Encryption, Subscriber Equipment, Interoperability, Migration)</li> </ul>

### 3.2 Project 25 System Description and Organization

P25 system overview documents describe how the users and manufacturers envision the P25 system, the logical interfaces and services the standards will specify, and the documents needed to completely characterize the P25 Standards Suite. Project 25 provides this information in TSB overview documents (sometimes referred to as “shell” documents). These documents provide an overview of the entire suite of standards for all interfaces and give a functional description for the current set of Common Air Interface features. (Note that the P25 documents suite contains overviews of individual interfaces and services, as well.) The current documents are listed in [Table 3](#).

**Table 3:** Project 25 System Description and Organization Documents

<b>Documents</b>
<ul style="list-style-type: none"> <li>■ <i>Project 25 System Description and Organization</i>, TSB-102A (Nov 1995) (Project 25 Overview, General System Model, Standards Organization, and Technical Requirements)</li> </ul>



## 4 Suite of Standards for Project 25 Interfaces and Systems

This section discusses the suite of standards documents for the (currently) eight interfaces of a P25 system. (See [Section 2](#) for a description of each how each interface fits in a P25 system.) For each of the interfaces, a table is provided to identify the documents that have been approved by TIA for publication. Once in publication, the documents are to be used by manufacturers to design, develop, and offer products to the public safety community that meet the P25 system standards. Similarly, public safety users can identify the TIA-published documents in their request for proposals (RFPs) of P25 systems to ensure that the products to be purchased are associated with the approved P25 standards.

### 4.1 Common Air Interface

The P25 Common Air Interface (CAI) uses frequency division multiple access (FDMA) methods with two modulations. The first defines the digital modulation used in the 12.5 kHz voice channel bandwidth and is mandatory for all P25 Phase 1 systems. The second defines the analog FM modulation used in 25 kHz and 12.5 kHz bandwidths and is mandatory in all P25 Phase 1 subscriber equipment (portable and mobile transceivers). Operation in a conventional mode is mandatory for P25 and operation using trunking is optional. The P25 structure defines trunking as a service. [Section 5.2](#) lists trunking related documents.

#### 4.1.1 FDMA Conventional Digital—Phase 1

**Mandatory** The following documents provide guidance necessary to meet the mandatory P25 FDMA conventional digital standard for Phase 1. ([Section 1.1.2](#) describes Phase 1.)

Table 4: FDMA Conventional Digital Documents—Phase 1

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 FDMA Common Air Interface Operational Description for Conventional Channels</i>, ANSI/TIA-102.BAAD (Dec 2003) (Unit Addressing, Repeater Addressing, Voice Transmit and Receive Operation, Packet Data Transmit and Receive Operation)</li> </ul>
<b>Protocol (Normative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 FDMA Common Air Interface</i>, ANSI/TIA-102.BAAA-A (Sep 2003) (Voice Coder, Voice Formats, Data Packets, Data Error Correction, Channel Access, Modulation, Transmit Bit Order)</li> <li>■ <i>Project 25 Link Control Word Formats and Messages</i>, ANSI/TIA-102.AABF-A (Dec 2004) (Part of voice message, Conventional and Trunked: Link Control Messages, Field Definitions, and Word Usages)</li> </ul>

Table 4: FDMA Conventional Digital Documents—Phase 1 (Continued)

Document Type	Documents
	<ul style="list-style-type: none"> <li data-bbox="586 317 1344 447">■ <i>Project 25 Link Control Word Formats and Messages Addendum 1</i>, ANSI/TIA-102.AABF-A-1 (Dec 2006) (Part of voice message, Conventional and Trunked: Link Control Messages, Field Definitions, and Word Usages)</li> <li data-bbox="586 470 1317 600">■ <i>Project 25 Link Control Word Formats Addendum 2 (for ISSI)</i>, ANSI/TIA-102.AABF-A-2 (Jul 2007) (Part of voice message, Conventional and Trunked: Link Control Messages, Field Definitions, and Word Usages)</li> <li data-bbox="586 623 1395 753">■ <i>Project 25 Link Control Word Formats Addendum 3 (for ISSI)</i>, TIA-102.AABF-A-3 (Jan 2008) (Symbols, Abbreviations, Terms, Definitions, Mnemonics, Link Control Word Overview and Word Formats)</li> <li data-bbox="586 777 1411 938">■ <i>Project 25 Conventional Control Messages</i>, TSB-102.AABG (Jul 1996) (Trunked system messages that may be applied to conventional systems: Emergency Alarm, Call Alert, Radio Check, Inhibit, and Uninhibit, Status Update and Request, Message, Telephone Interconnect Dialing, Radio Unit Monitor)</li> <li data-bbox="586 961 1370 1092">■ <i>Project 25 Conventional Control Messages, Addendum 1 – Individual Telephone Calls</i>, TSB-102.AABG-1 (May 2006) (Control Messages Specifications, Annex A Message Sequence (informative))</li> </ul>
<p><b>Conformance Tests Procedures:</b></p>	<p style="text-align: center;"><b>Compliance Assessment Documents</b></p> <ul style="list-style-type: none"> <li data-bbox="586 1171 1365 1299">■ <i>Project 25 Common Air Interface Conformance Test</i>, ANSI/TIA-102.BAAB-B (Mar 2005) (Transmit Voice Format Tests, Transmit Data Format Tests, Receiver Tests)</li> <li data-bbox="586 1323 1411 1453">■ <i>Project 25 Conformance Profile – Level One – Basic Conventional Operation</i>, TIA-102.XXXX (draft, Aug 2008) (Group and Individual Calls via Repeater Operation, Group and Individual Calls via Direct Operation, and Telephone and PSTN Operations)</li> <li data-bbox="586 1476 1386 1535">■ <i>Project 25 Conformance Profile – Level Two – Advanced Conventional Operation</i>, TIA-102.XXXX (draft, Jan 2009)</li> </ul>
	<ul style="list-style-type: none"> <li data-bbox="586 1564 1373 1694">■ <i>Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods</i>, ANSI/TIA-102.CAAA-B (Dec 2004) (Methods of Measurements for Receivers, Transmitters, Trunking Systems, Unit Characteristics)</li> </ul>
<p><b>Performance Measurement Methods:</b></p>	

Table 4: FDMA Conventional Digital Documents—Phase 1 (Continued)

Document Type	Documents
<b>Performance Recommendations:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Land Mobile Radio Transceiver Recommendations, C4FM/CQPSK Modulation</i>, ANSI/TIA-102.CAAB-B (Jul 2004) (Standards for All Equipment: Receiver Section, Transmitter Section, Trunked System Timing Characteristics, Unit Characteristics)</li> </ul>
<b>Interoperability Test Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Interoperability Test Procedures Conventional Voice Equipment</i>, TSB-102.CABA (Feb 2002) (Subscriber Tests, Repeater Tests, Vocoder and Late Entry Tests, Analog Compatibility Tests, Encrypted Voice Tests)</li> </ul>

### 4.1.2 FDMA Conventional Analog—Phase 1

**Mandatory** FDMA conventional analog capabilities are mandatory for P25 Phase 1 subscriber equipment to provide backward compatibility with non-P25 systems. [Section 6.1](#) lists the documents associated with this P25 equipment feature.

### 4.1.3 FDMA Trunked Digital—Phase 1

**Optional** Support for FDMA trunked digital capabilities is optional (mandatory if supporting FDMA Trunked Digital features) for Phase 1 P25 systems. [Section 5.2.1](#) lists the documents associated with this P25 services feature.

### 4.1.4 TDMA Trunked Digital—Phase 2

**Optional** Support for Time division multiple access (TDMA) trunked digital capabilities is optional (mandatory if supporting TDMA Trunked Digital features) for Phase 2 P25 systems. [Section 5.2.2](#) lists the documents associated with this P25 services feature.

### 4.1.5 Vocoder

**Mandatory** The following documents provide guidance necessary to meet the mandatory P25 system voice services vocoder standard.

Table 5: Vocoder Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	(No documents are necessary or applicable)

Table 5: Vocoder Documents (Continued)

Document Type	Documents
<b>Protocol (Normative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Vocoder Description</i>, ANSI/TIA-102.BABA (Dec 2003) (Multi-Band Excitation Speech Model, Speech Input/Output Requirements, Speech Analysis, Parameter Encoding and Decoding, Bit Manipulations, Spectral Amplitude Enhancement, Adaptive Smoothing, Parameter Encoding Example, Speech Synthesis)</li> <li>■ <i>Project 25 Vocoder Description Addendum 1</i>, TIA-102.BABA-1 (vocoder task group draft, tbd; TR8.4 approval, tbd)</li> </ul>
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Vocoder Mean Opinion Score Conformance Test</i>, ANSI/TIA-102.BABB (May 1999) (Speech Data Bases, Production of Digital Vocoder Recorded Tapes, Subjective Evaluation of Speech Quality, MOS Result Analysis)</li> <li>■ <i>Project 25 Vocoder Reference Test</i>, ANSI/TIA-102.BABC (Apr 1999) (A25VCTS Operation Manual, Test Computer Hardware and I/O Circuitry, Test Computer Software, Objective Performance Requirements)</li> <li>■ <i>Project 25 Vocoder Selection Process</i>, TSB-102.BABD (May 1996) (Evaluation procedures for assessing various digital voice coding technology proposals for Project 25)</li> </ul>
<b>Performance Measurement Methods:</b>	(No documents are currently under development)
<b>Performance Recommendations:</b>	(No documents are currently under development)
<b>Interoperability Test Procedures:</b>	(No documents are currently under development)

### 4.1.6 General CAI Documents

**Mandatory**      The following general CAI documents provide guidance necessary to meet the mandatory P25 CAI standard.

Table 6: General Common Air Interface Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	(No documents are currently under development)

Table 6: General Common Air Interface Documents (Continued)

Document Type	Documents
<b>Protocol (Normative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Common Air Interface Reserved Values</i>, ANSI/TIA-BAAC-A (Dec 2003) (Special reserved values for particular fields of information, such as Network Access Code, Link Control Format, Key ID, Algorithm ID, etc.)</li> </ul>
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	(No documents are currently under development)
<b>Performance Measurement Methods:</b>	(No documents are currently under development)
<b>Performance Recommendations:</b>	(No documents are currently under development)
<b>Interoperability Test Procedures:</b>	(No documents are currently under development)

## 4.2 Inter-RF Subsystem Interface

Table 7 and Table 8 list current Scope 1 and Scope 2 P25 Inter-RF Subsystem Interface (ISSI) description, specification, and assessment documents.

### 4.2.1 Scope 1 – Voice Services

#### Optional

The following documents provide guidance necessary to meet the optional (mandatory if supporting RFSS) Scope 1 P25 protocol standards defining ISSI support of P25 trunked voice service among multi-jurisdictional systems. This includes support for roaming subscriber equipment, with the following objectives:

- Mobility management
- Call control
- Push-to-talk management

Table 7: Inter-RF Subsystem Interface Documents, Scope 1 – Voice Services

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Inter-RF Subsystem Interface Overview</i>, TSB-102.BACC-A (Dec 2003) (ISSI Requirements and Standards Considerations)</li> </ul>

Table 7: Inter-RF Subsystem Interface Documents, Scope 1 – Voice Services (Continued)

Document Type	Documents
<b>Protocol (Normative):</b>	<ul style="list-style-type: none"> <li data-bbox="587 317 1409 478">■ <i>Project 25 Inter-RF Subsystem Interface Messages and Procedures for Voice Services</i>, ANSI/TIA-102.BACA (Aug 2006) (Architecture and Protocol Suite Overview, SIP Messages and Parameters Definition, RTP Message Vocabulary, Mobility Management, Call Control, and Push-to-Talk Management)</li> <li data-bbox="587 506 1409 793">■ <i>Project 25 Inter-RF Subsystem Interface Messages and Procedures — Addendum 1 — Erratum to Fix Errors and Omissions</i>, ANSI/TIA-102.BACA-1 (Apr 2007) (Architecture and Protocol Suite Overview, SIP Messages and Parameters Definition, SIP Transport, RTP Message Vocabulary, Mobility Management, Call Control, Push-to-Talk Management, Annex A (Normative) – Table of Timers and Constants, Annex B (Informative) – SU-to-SU Call Flows, Annex C (Informative) – Group Call Flows, Annex D (Informative) – Future Considerations)</li> <li data-bbox="587 821 1409 877">■ <i>Update to Project 25 Inter-RF Subsystem Interface Messages and Procedures</i>, TIA-102.BACA-A (ISSI TG draft, tbd; TR8.19 approval, tbd)</li> </ul>
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	<ul style="list-style-type: none"> <li data-bbox="587 955 1409 1045">■ <i>Project 25 Inter-RF Subsystem Interface Conformance Test Procedures for Voice Services</i>, TIA-102.BACx (ISSI TG approval, Jan 2008; TR8.19 approval, tbd)</li> </ul>
<b>Performance Measurement Methods:</b>	<ul style="list-style-type: none"> <li data-bbox="587 1073 1409 1199">■ <i>Project 25 Inter-RF Subsystem Interface Measurement Methods for Voice Services</i>, ANSI/TIA-102.CACA (Apr 2007) (ISSI Voice Services Performance Models, Performance Parameters, and Measurement Procedures)</li> </ul>
<b>Performance Recommendations:</b>	<ul style="list-style-type: none"> <li data-bbox="587 1228 1409 1325">■ <i>Project 25 Inter-RF Subsystem Interface Measurement Recommendations for Voice Services</i>, ANSI/TIA-102.CACB (Apr 2007) (ISSI Voice Services Performance Models and Performance Objectives)</li> </ul>
<b>Interoperability Test Procedures:</b>	<ul style="list-style-type: none"> <li data-bbox="587 1346 1409 1436">■ <i>Project 25 Inter-RF Subsystem Interface Interoperability Test Procedures for Voice Services</i>, TIA-102.XXXX (ISSI TG approval tbd; CAPP TG approval tbd)</li> </ul>

## 4.2.2 Scope 2 – Additional Project 25 Services

### Optional

The following documents provide guidance necessary to meet the optional (mandatory if supporting RFSS) Scope 2 P25 protocol standards defining ISSI support of four additional P25 services among multi-jurisdictional systems:

- P25 supplementary data service (e.g., call alert)
- P25 packet data on the Data Network Interface (including Over-The-Air-Rekeying (OTAR))
- ISSI support of the P25 Console Subsystem Interface (CSSI)
- P25 conventional voice service (including mixed trunked/conventional voice service)

Table 8: Inter-RF Subsystem Interface Documents, Scope 2 – Additional P25 Services

Document Type	Documents
Overview (Informative):	<b>Description and Specification Documents</b>
	<ul style="list-style-type: none"> <li>■ <i>Project 25 Inter-RF Subsystem Interface Overview</i>, TSB-102.BACC-A (Dec 2003) (ISSI Requirements and Standards Considerations)</li> </ul>
Protocol (Normative):	<ul style="list-style-type: none"> <li>■ <i>Project 25 Inter-RF Subsystem Interface Messages and Procedures — Packet Data/Over-the-Air Rekeying (OTAR)</i>, TIA-102.BACA-X (ISSI TG draft, Jun 2008; TR8.19 approval, Jan Apr 2009)</li> </ul>
	<ul style="list-style-type: none"> <li>■ <i>Project 25 Inter-RF Subsystem Interface Messages and Procedures — Addendum 2 — Trunked Console ISSI</i>, ANSI/TIA-102.BACA-2 (Apr 2007) (Architecture and Protocol Suite Overview; Sip Messages and Parameters Definition, RTP Message Vocabulary, Mobility Management, Mobility Management, Push-To-Talk Management, Annex A (Normative) – Table of Timers and Constants; Annex B (Informative) – SU-to-SU Call Flows; Annex C (Informative) – Group Call Flows; Annex D (Informative) – Future Considerations; Annex E (Informative) – Console Functionality)</li> </ul>
	<ul style="list-style-type: none"> <li>■ <i>Project 25 Inter-RF Subsystem Interface Messages and Procedures for Voice and Mobility Management Services — Addendum 3 — Supplementary Data</i>, ANSI/TIA-102.BACA-3 (Apr 2007) (P25 Supplementary Data Services, P25 Packet Data on the Ed Interface, ISSI Support of the P25 Console Subsystem Interface, P25 Conventional Voice Service)</li> <li>■ <i>Project 25 Inter-RF Subsystem Interface Messages and Procedures for Supplementary Data</i>, ANSI/TIA-102.BACD (Apr 2007) (Overview of Architecture and Protocol Suite, SIP Messages and Parameters Definition, Mobility Management, Supplementary Data Procedures, Message Sequence Charts (Informative))</li> </ul>

Table 8: Inter-RF Subsystem Interface Documents, Scope 2 – Additional P25 Services (Continued)

Document Type	Documents
	<ul style="list-style-type: none"> <li>■ <i>Project 25 Inter-RF Subsystem Interface Messages and Procedures for Conventional Operation</i>, TIA-102.BACE (Jan 2008) (Overview of Architecture and Protocol Suite, Application Protocols – Complexity 1, Call and Transmission Control, Timer Values and Constants, Transmission Control Call Flows)</li> </ul>
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Inter-RF Subsystem Interface Conformance Test Procedures for Additional P25 Services</i>, TIA-102.BAxx (ISSI TG expected to start Jan 2007; TR8.19 approval Jan 2008)</li> </ul>
<b>Performance Measurement Methods:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Inter-RF Subsystem Interface Measurement Methods for Voice Services — Addendum 1 — Trunked Console</i>, TIA-102.CACA-1 (ISSI TG approval, Jan 2008; TR8.19 approval, tbd)</li> </ul>
<b>Performance Recommendations:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Inter-RF Subsystem Interface Measurement Recommendations for Voice Services — Addendum 1 — Trunked Console</i>, TIA-102.CACB-1 (ISSI TG approval, Jan 2008; TR8.19 approval, tbd)</li> </ul>
<b>Interoperability Test Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Inter-RF Subsystem Interface Interoperability Test Procedures for Additional P25 Services</i>, TIA-102.XXXX (ISSI TG expected to start Jan 2007; CAPP TG approval Dec 2007)</li> </ul>

### 4.3 Fixed Station Subsystem Interface

**Optional**      The following documents provide guidance necessary to meet the optional (mandatory if using an RFSS) P25 Fixed Station Subsystem Interface (FSSI) standard.

Table 9: Fixed Station Subsystem Interface Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Fixed Station Subsystem Interface Overview</i>, TIA-102.XXXX (FSSI TG approval Oct 2007; TR8.19 approval tbd)</li> </ul>
<b>Protocol (Normative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Fixed Station Interface, Messages and Procedures</i>, ANSI/TIA-102.BAHA (Jun 2006) (Defines a Conventional Fixed Station Interface (CFSI) between a conventional fixed station of a Fixed Station Subsystem and a Conventional Fixed Station Host (CFSH), voice services only) (CFSI Architecture, CFSI Analog Interface, and CFSI Digital Interface)</li> </ul>
	<ul style="list-style-type: none"> <li>■ <i>Project 25 Fixed Station Interface, Messages and Procedures</i>, TIA-102.BAHA-A (FSSI TG approval Oct 2007; TR8.19 tbd)</li> </ul>

Table 9: Fixed Station Subsystem Interface Documents (Continued)

Document Type	Documents
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Fixed Station Interface Conformance Test Procedure</i>, ANSI/TIA-102.CADA (Apr 2007) (conventional systems, voice services only)</li> </ul>
<b>Performance Measurement Methods:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Fixed Station Interface Measurement Methods</i>, TIA-102.XXXX (draft from FSSI TG tbd; TR8.19 approval tbd)</li> </ul>
<b>Performance Recommendations:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Fixed Station Interface Performance Specifications</i>, TIA-102.XXXX (draft from FSSI TG tbd; TR8.19 approval tbd)</li> </ul>
<b>Interoperability Test Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Fixed Station Interface Interoperability Testing Procedures</i>, TIA-102.XXXX (draft from FSSI TG tbd; CAPP TG approval tbd)</li> </ul>

## 4.4 Console Subsystem Interface

**Optional**      The following documents provide guidance necessary to meet the optional (mandatory if using an RFSS) P25 Console Subsystem Interface (CSSI) standard.

Table 10: Console Subsystem Interface Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Console Subsystem Interface Overview</i>, TSB-102.BAGA (CSSI TG approval Aug 2007; TR8.19 approval tbd)</li> </ul>
<b>Protocol (Normative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Inter-RF Subsystem Interface Messages and Procedures — Addendum 2 — Trunked Console ISSI</i>, ANSI/TIA-102.BACA-2 (Apr 2007) (Architecture and Protocol Suite Overview; Sip Messages, Parameters Definition, and RTP Message Vocabulary for ISSI; Mobility Management; Mobility Management; Push-To-Talk (PTT) Management; Annex A (Normative) – Table of Timers and Constants; Annex B (Informative) – SU-to-SU Call Flows; Annex C (Informative) – Group Call Flows; Annex D (Informative) – Future Considerations; Annex E (Informative) – Console Functionality)</li> </ul>
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Console Subsystem Interface Conformance</i>, TIA-102.XXXX (CSSI TG approval tbd; TR8.19 approval tbd)</li> </ul>
<b>Performance Measurement Methods:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Inter-RF Subsystem Interface Measurement Methods for Voice Services — Addendum 1 — Trunked Console</i>, TIA-102.CACA-1 (ISSI TG approval, Jan 2008; TR8.19 approval, tbd)</li> </ul>

Table 10: Console Subsystem Interface Documents (Continued)

Document Type	Documents
<b>Performance Recommendations:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Inter-RF Subsystem Interface Measurement Recommendations for Voice Services — Addendum 1 — Trunked Console</i>, TIA-102.CACB-1 (ISSI TG approval, Jan 2008; TR8.19 approval, tbd)</li> </ul>
<b>Interoperability Test Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Console Subsystem Interface Interoperability Testing Procedures</i>, TIA-102.XXXX (CSSI TG approval Jan 2007; CAPP TG approval Aug 2007)</li> </ul>

## 4.5 Subscriber Data Peripheral Interface and Data Interface

**Optional** The following documents provide guidance necessary to meet the optional (mandatory if supporting data interface features) P25 Subscriber Data Peripheral Interface standard and P25 Data Network Interface standard.

Table 11: Subscriber Data Peripheral Interface and Data Network Interface Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Data Overview</i>, ANSI/TIA-102.BAEA-A (Jun 2004) (Overview, Categories, Data Services, and Data Configurations)</li> </ul>
<b>Protocol (Normative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Packet Data Specification</i>, ANSI/TIA-102.BAEB-A (Mar 2005) (Overview of Packet Switched Services, MDP/MRC “A” Interface Packet Data, Air Interface “U<sub>M</sub>” Packet Data, RFG/ES Interface “E<sub>D</sub>” Packet Data, SNDCP Field Definitions and PDU Mappings)</li> <li>■ <i>Project 25 Circuit Data Specification</i>, TIA-102.BAEC (Last update was Jun 2000; this document will be rescinded in five years or less) (Overview of Circuit Switched Services, MDP/MRC “A” Interface Circuit Switched Data, MRC/RFG Protocol “U<sub>M</sub>” Circuit Data, Host Interface “E” Circuit Data, Procedures)</li> <li>■ <i>Project 25 Radio Control Protocol (RCP)</i>, ANSI/TIA-102.BAEE-A (Sep 2004) (RPC: Protocol Characteristics, Request, Response, and Report Class Service Data Units, Simple Network Management Protocol (SNMP): Overview, P25 SNMP Node and RMP MIB Definitions)</li> </ul>
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Data Interface Conformance</i>, TIA-102.XXXX (XXXX TG or TR8.n approval tbd; TR8.n approval tbd)</li> </ul>

Table 11: Subscriber Data Peripheral Interface and Data Network Interface Documents (Continued)

Document Type	Documents
<b>Performance Measurement Methods:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods</i>, ANSI/TIA-102.CAAA-B (Dec 2004) (Methods of Measurements for Receivers, Transmitters, Trunking Systems, Unit Characteristics)</li> </ul>
<b>Performance Recommendations:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Land Mobile Radio Transceiver Recommendations, C4FM/CQPSK Modulation</i>, ANSI/TIA-102.CAAB-B (Jul 2004) (Standards for All Equipment: Receiver Section, Transmitter Section, Trunked System Timing Characteristics, Unit Characteristics)</li> </ul>
<b>Interoperability Test Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Interoperability Test Procedures Conventional Voice Equipment</i>, TSB-102.CABA (Feb 2002) (Subscriber Tests, Repeater Tests, Vocoder and Late Entry Tests, Analog Compatibility Tests, Encrypted Voice Tests)</li> <li>■ <i>Project 25 Interoperability Testing for Voice Operation in Trunked Systems</i>, ANSI/TIA-102.CABC (September 2006) (trunked systems, voice only) (Interoperability Test Procedures: Regular, Queued or Denied, and Announcement Group Call Tests, Protected Traffic Channel Tests, and informative test procedures that are conditional on other trunking documents modification)</li> </ul>

## 4.6 Network Management Interface

**Optional** The following documents provide guidance necessary to meet the optional (mandatory if using an RFSS) P25 Network Management Interface standard.

Table 12: Network Management Interface Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Network Management Interface Overview</i>, TSB-102.BAFA-A (Jul 1999) (Network Management Hierarchy, Transport Medium for Network Management Info, System Management Functional Areas)</li> </ul>
<b>Protocol (Normative):</b>	(No documents are necessary or applicable)
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Network Management Interface Conformance</i>, TIA-102.XXXX (XXXX TG or TR8.n approval tbd; TR8.n approval tbd)</li> </ul>
<b>Performance Measurement Methods:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Network Management Interface Measurement Methods</i>, TIA-102.XXXX (XXXX TG or TR8.n approval tbd; TR8.n approval tbd)</li> </ul>

Table 12: Network Management Interface Documents (Continued)

Document Type	Documents
<b>Performance Recommendations:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Network Management Interface Performance Specifications</i>, TIA-102.XXXX (XXXX TG or TR8.n approval tbd; TR8.n approval tbd)</li> </ul>
<b>Interoperability Test Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Network Management Interface Interoperability Testing Procedures</i>, TIA-102.XXXX (XXXX TG or TR8.n approval tbd; CAPP TG approval tbd)</li> </ul>

## 4.7 Telephone Interconnect Interface

**Optional** The following documents provide guidance necessary to meet the optional (mandatory if supporting telephone interconnect features) P25 Telephone Interconnect Interface standard.

Table 13: Telephone Interconnect Interface Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	<ul style="list-style-type: none"> <li>■ <i>Telephone Interconnect Requirements and Definitions (Voice Services)</i>, ANSI/TIA-102.BADA (Mar 2000) (General Subscriber Equipment and RF Subsystem Operations, Optional Analog and Digital Interfaces, Appendix A Project 25 Mandatory vs. Optional Tables)</li> <li>■ <i>Telephone Interconnect Requirements and Definitions (Voice Services)</i>, Addendum 1-Conventional Individual Calls, ANSI/TIA-102.BADA-1 (Apr 2006) (General Subscriber Equipment and RF Subsystem Operations, Annex A Project 25 Mandatory vs. Optional Tables (Normative), Annex B Message Sequence (Informative))</li> </ul>
<b>Protocol (Normative):</b>	(No documents are necessary or applicable)
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Interoperability Profile – Level One Basic Conventional Operation</i>, 102.XXXX (XXXX TG or TR8.n approval tbd; TR8.n approval tbd) (Group and Individual Calls via Repeater Operation, Group and Individual Calls via Direct Operation, and Telephone and PSTN Operations)</li> </ul>
<b>Performance Measurement Methods:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Telephone Interconnect Interface Measurement Methods</i>, 102.XXXX (XXXX TG or TR8.n approval tbd; TR8.n approval tbd)</li> </ul>

Table 13: Telephone Interconnect Interface Documents (Continued)

<b>Document Type</b>	<b>Documents</b>
<b>Performance Recommendations:</b>	■ <i>Project 25 Telephone Interconnect Interface Performance Specifications, 102.XXXX (XXXX TG or TR8.n approval tbd; TR8.n approval tbd)</i>
<b>Interoperability Test Procedures:</b>	■ <i>Project 25 Telephone Interconnect Interface Interoperability Testing Procedures, 102.XXXX (XXXX TG or TR8.n approval tbd; CAPP TG approval tbd)</i>



## 5 Suite of Standards for Project 25 Services

This section discusses the suite of standards documents for the (currently) two services of a P25 system. For each of the services, a table is provided to identify the documents that have been approved by TIA for publication. Once in publication, the documents are to be used by manufacturers to design, develop, and offer products to the public safety community that meet the P25 system standards. Similarly, public safety users can identify the TIA-published documents in their RFPs of P25 systems to ensure that the products to be purchased are associated with the approved P25 standards.

Project 25 currently has two broad categories of services. The first deals with encryption for security of voice and data as well as security of radio control channels, etc. The second deals with trunking of radio channels to promote spectrum efficiency.

### 5.1 Encryption Services

Several encryption algorithms are available for use with P25 systems. The oldest algorithm, for which there are P25 standards documents, is Data Encryption Standard (DES). This particular algorithm is no longer endorsed (after May 2005) by the Federal Government for secure communications. The most recently endorsed algorithm is Advanced Encryption Standard (AES) and must be used by all Federal agency communications systems beyond May 2007. The recommendation has been that State and local agencies also transition to AES to ensure interoperability.

The following subsections define the two algorithms and their use, a standard key fill device to manually load encryption keys into P25 radios, and a standard over-the-air-rekeying (OTAR) procedure to automatically rekey P25 radios.

Encryption is an option for P25 systems but when it is desired, the following standards apply.

#### 5.1.1 Advanced Encryption Standard

**Optional**            The following documents provide guidance necessary to meet the optional (mandatory if supporting AES features) P25 standard for advanced encryption.

Table 14: Encryption – Advanced Encryption Standard Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Security Services Overview</i>, ANSI/TIA-102.AAAB-A (Jan 2005) (Security Threats, Confidentiality, Integrity, Authentication, and Key Management)</li> </ul>
<b>Protocol (Normative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Block Encryption Protocol</i>, ANSI/TIA-102.AAAD (Jul 2002) (Keystream Generator, Voice Operation, Data Operation, Mandatory Algorithm – DES, Triple Data Encryption Algorithm (TDEA), and AES)</li> </ul>

Table 14: Encryption – Advanced Encryption Standard Documents (Continued)

Document Type	Documents
	<ul style="list-style-type: none"> <li>■ <i>Project 25 Link Layer Authentication</i>, ANSI/TIA-102.AACE (Dec 2005) (Challenge and Response Authentication, Procedures and Operational Descriptions, Control Channel Messages, Key Management and Provisioning, Authentication Mechanism and AES Crypto Details)</li> </ul>
<b>Conformance Tests Procedures:</b>	<b>Compliance Assessment Documents</b>
	(No documents currently under development)
<b>Performance Measurement Methods:</b>	<p>No specific documents planned for AES, but the following document also applies:</p> <ul style="list-style-type: none"> <li>■ <i>Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods</i>, ANSI/TIA-CAAA-B (Dec 2004) (Methods of Measurements for Receivers, Transmitters, Trunking Systems, Unit Characteristics)</li> </ul>
<b>Performance Recommendations:</b>	<p>No specific documents planned for AES, but the following document also applies:</p> <ul style="list-style-type: none"> <li>■ <i>Project 25 Land Mobile Radio Transceiver Recommendations, C4FM/CQPSK Modulation</i>, ANSI/TIA-CAAB-B (Jul 2004) (Standards for All Equipment: Receiver Section, Transmitter Section, Trunked System Timing Characteristics, Unit Characteristics)</li> </ul>
<b>Interoperability Test Procedures:</b>	<p>No specific documents planned for AES, but the following documents also applies:</p> <ul style="list-style-type: none"> <li>■ <i>Project 25 Interoperability Test Procedures Conventional Voice Equipment</i>, TSB-102.CABA (Feb 2002) (Subscriber Tests, Repeater Tests, Vocoder and Late Entry Tests, Analog Compatibility Tests, Encrypted Voice Tests)</li> <li>■ <i>Project 25 Interoperability Testing for Voice Operation in Trunked Systems</i>, ANSI/TIA-102.CABC (September 2006) (trunked systems, voice only) (Interoperability Test Procedures: Regular, Queued or Denied, and Announcement Group Call Tests, Protected Traffic Channel Tests, and informative test procedures that are conditional on other trunking documents modification)</li> </ul>

## 5.1.2 Data Encryption Standard

**Optional** The following documents provide guidance necessary to meet the optional (mandatory if supporting DES features) P25 standard data encryption.

Table 15: Encryption – Data Encryption Standard Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Security Services Overview</i>, ANSI/TIA-102.AAAB-A (Jan 2005) (Security Threats, Confidentiality, Integrity, Authentication, and Key Management)</li> </ul>
<b>Protocol (Normative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Block Encryption Protocol</i>, ANSI/TIA-102.AAAD (Jul 2002) (Keystream Generator, Voice Operation, Data Operation, Mandatory Algorithm – DES, Triple Data Encryption Algorithm (TDEA), and AES)</li> <li>■ <i>Project 25 Link Layer Authentication</i>, ANSI/TIA-102.AACE (Dec 2005) (Challenge and Response Authentication, Procedures and Operational Descriptions, Control Channel Messages, Key Management and Provisioning, Authentication Mechanism and AES Crypto Details)</li> </ul>
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Conformance Test for Project 25 DES Encryption Protocol</i>, ANSI/TIA-102.AAAC (Apr 2007) (Test Parameters, Transmitter Tests, and Receiver Tests)</li> </ul>
<b>Performance Measurement Methods:</b>	<p>No specific documents planned for DES, but the following document also applies:</p> <ul style="list-style-type: none"> <li>■ <i>Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods</i>, ANSI/TIA-CAAA-B (Dec 2004) (Methods of Measurements for Receivers, Transmitters, Trunking Systems, Unit Characteristics)</li> </ul>
<b>Performance Recommendations:</b>	<p>No specific documents planned for DES, but the following document also applies:</p> <ul style="list-style-type: none"> <li>■ <i>Project 25 Land Mobile Radio Transceiver Recommendations, C4FM/CQPSK Modulation</i>, ANSI/TIA-CAAB-B (Jul 2004) (Standards for All Equipment: Receiver Section, Transmitter Section, Trunked System Timing Characteristics, Unit Characteristics)</li> </ul>

Table 15: Encryption – Data Encryption Standard Documents (Continued)

Document Type	Documents
<b>Interoperability Test Procedures:</b>	No specific documents planned for DES, but the following documents also apply: <ul style="list-style-type: none"> <li data-bbox="587 386 1403 512"> <span style="color: #000080;">■</span> <i>Project 25 Interoperability Test Procedures Conventional Voice Equipment</i>, TSB-102.CABA (Feb 2002)                          (Subscriber Tests, Repeater Tests, Vocoder and Late Entry Tests, Analog Compatibility Tests, Encrypted Voice Tests)                     </li> <li data-bbox="587 537 1403 764"> <span style="color: #000080;">■</span> <i>Project 25 Interoperability Testing for Voice Operation in Trunked Systems</i>, ANSI/TIA-102.CABC (September 2006)                          (trunked systems, voice only)                          (Interoperability Test Procedures: Regular, Queued or Denied, and Announcement Group Call Tests, Protected Traffic Channel Tests, and informative test procedures that are conditional on other trunking documents modification)                     </li> </ul>

### 5.1.3 Key Fill Device

**Optional**            The following documents provide guidance necessary to meet the optional (mandatory if supporting Key Fill features) P25 Key Fill Device standard.

Table 16: Encryption – Key Fill Device Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	(No documents are necessary or applicable)
<b>Protocol (Normative):</b>	<ul style="list-style-type: none"> <li data-bbox="587 1268 1260 1365"> <span style="color: #000080;">■</span> <i>Project 25 Key Fill Device (KFD) Interface Protocol</i>, ANSI/TIA-102.AACD (Feb 2005)                          (Manual Rekeying Overview, Interface Protocol Definition)                     </li> </ul>
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	(No documents are necessary or applicable)
<b>Performance Measurement Methods:</b>	(No documents are necessary or applicable)
<b>Performance Recommendations:</b>	(No documents are necessary or applicable)
<b>Interoperability Test Procedures:</b>	(No documents are necessary or applicable)

## 5.1.4 Over-the-Air Rekeying

**Optional** The following documents provide guidance necessary to meet the optional (mandatory if supporting OTAR features) P25 OTAR standard.

Table 17: Encryption – Over-the-Air Rekeying Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Over-the-Air Rekeying (OTAR) Protocol</i>, ANSI/TIA-102.AACA (Apr 2001) (Overview of Key Management Techniques, Overview of Protocol – Mandatory and Optional Key Management Procedures, Definition and Use of Response Kinds)</li> <li>■ <i>Project 25 Over-the-Air Rekeying (OTAR) Protocol Addendum 1</i>, TSB-102.AACA-1 (Nov 2002) (Encryption Modes, Annex A and B (Normative))</li> <li>■ <i>Project 25 Over-the-Air Rekeying (OTAR) Protocol Addendum 2</i>, ANSI/TIA-102.AACA-2 (Mar 2003) (Key Management Techniques, Protocol – Mandatory and Optional Key Management Procedures, Definition and Use of Response Kinds, Annex A and B (Normative))</li> </ul>
<b>Protocol (Normative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Over-the-Air Rekeying (OTAR) Operational Description</i>, ANSI/TIA-102.AACB (Nov 2002) (Key Management Overview, OTAR Concepts, Key Management Definitions and Using OTAR)</li> </ul>
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Conformance Tests for Project 25 Over-the-Air Rekeying (OTAR) Protocol</i>, ANSI/TIA-102.AACC-A (Aug 2006) (Test Parameters: (Packet Data Parameters, Encryption Parameters, Key Management Message (KMM) Common Parameters, and OTAR Input Data File Parameters), KMM Generation Tests, and KMM Receiver Tests)</li> </ul>
<b>Performance Measurement Methods:</b>	<p>No specific documents planned for OTAR rekeying, but the following document also applies:</p> <ul style="list-style-type: none"> <li>■ <i>Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods</i>, ANSI/TIA-CAAA-B (Dec 2004) (Methods of Measurements for Receivers, Transmitters, Trunking Systems, Unit Characteristics)</li> </ul>

Table 17: Encryption – Over-the-Air Rekeying Documents (Continued)

Document Type	Documents
<b>Performance Recommendations:</b>	No specific documents planned for OTAR rekeying, but the following document also applies: <ul style="list-style-type: none"> <li>■ <i>Project 25 Land Mobile Radio Transceiver Recommendations, C4FM/CQPSK Modulation</i>, ANSI/TIA-102.CAAB-B (Jul 2004) (Standards for All Equipment: Receiver Section, Transmitter Section, Trunked System Timing Characteristics, Unit Characteristics)</li> </ul>
<b>Interoperability Test Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Interoperability Test Procedures – Over-the-Air Rekeying (OTAR)</i>, ANSI/TIA-102.CABB (Aug 2003)</li> </ul>

## 5.2 Trunked Services

Project 25 allows an option to use trunking to increase radio system efficiencies. One trunking scheme uses the radio channels in a frequency division multiple access (FDMA) mode. A second scheme uses the FDMA traffic channels in a time division multiple access (TDMA) mode to further increase the spectrum efficiencies. The two schemes are defined below.

### 5.2.1 FDMA Trunked Digital—Phase 1

**Optional** The following documents provide guidance necessary to meet the optional (mandatory if supporting FDMA Trunked Digital features) Phase 1 P25 FDMA Trunked Digital standard. (Section 1.1.2 describes Phase 1.)

Table 18: FDMA Trunked Digital Documents—Phase 1

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Trunking Overview</i>, ANSI/TIA-102.AABA-A (Jun 2004) (Trunking Overview, Voice and Data Services)</li> <li>■ <i>Project 25 Trunking Procedures</i>, TSB-102.AABD (Oct 1997) (Control and Traffic Channels, Random Access Procedures, Control Channel Acquisition and Retention, Registration and Authentication, Voice Call, Data Call, Wide Area Call, Supplementary Services, and System Status Procedures)</li> </ul>
<b>Protocol (Normative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Trunking Control Channel Formats</i>, ANSI/TIA-102.AABB-A (Jul 2005) (Control Channel Designation and Modes, Inbound Control Channel Access, Packet and Information Block Structures)</li> </ul>

Table 18: FDMA Trunked Digital Documents—Phase 1 (Continued)

Document Type	Documents
	<ul style="list-style-type: none"> <li data-bbox="586 317 1409 478">■ <i>Project 25 Trunking Control Channel Messages</i>, ANSI/TIA-102.AABC-B (Jan 2005) (Trunking Packet Description, Single and Multiple Block Packet Structures, Field Definitions, Voice, Data, Control and Status Services, Inbound and Outbound Signaling Packets)</li> <li data-bbox="586 506 1409 667">■ <i>Project 25 Trunking Control Channel Messages, Addendum</i>, ANSI/TIA-102.AABC-B1 (Nov 2006) (Trunking Packet Description, Single and Multiple Block Packet Structures, Field Definitions, Voice, Data, Control and Status Services, Inbound and Outbound Signaling Packets)</li> <li data-bbox="586 695 1409 856">■ <i>Project 25 Trunking Control Channel Messages, Addendum</i>, ANSI/TIA-102.AABC-B2 (Aug 2007) (Trunking Packet Description, Single and Multiple Block Packet Structures, Field Definitions, Voice, Data, Control and Status Services, Reason Codes)</li> </ul>
	<ul style="list-style-type: none"> <li data-bbox="586 871 1409 1033">■ <i>Project 25 Trunking Control Channel Messages, Addendum</i>, TIA-102.AABC-B3 (Jan 2008) (Trunking Packet Description, Single and Multiple Block Packet Structures, Field Definitions, Voice, Data, Control and Status Services, Reason Codes)</li> </ul>
	<ul style="list-style-type: none"> <li data-bbox="586 1060 1409 1192">■ <i>Project 25 Link Control Word Formats and Messages</i>, ANSI/TIA-102.AABF-A (Dec 2004) (Part of voice message, Conventional and Trunked: Link Control Messages, Field Definitions, and Word Usages)</li> </ul>
	<ul style="list-style-type: none"> <li data-bbox="586 1222 1409 1354">■ <i>Project 25 Link Control Word Formats and Messages Addendum 1</i>, ANSI/TIA-102.AABF-A-1 (Dec 2006) (Part of voice message, Conventional and Trunked: Link Control Messages, Field Definitions, and Word Usages)</li> </ul>
	<ul style="list-style-type: none"> <li data-bbox="586 1375 1409 1507">■ <i>Project 25 Link Control Word Formats Addendum 2 (for ISSI)</i>, ANSI/TIA-102.AABF-A-2 (Jul 2007) (Part of voice message, Conventional and Trunked: Link Control Messages, Field Definitions, and Word Usages)</li> </ul>
	<ul style="list-style-type: none"> <li data-bbox="586 1522 1409 1654">■ <i>Project 25 Link Control Word Formats Addendum 3 (for ISSI)</i>, TIA-102.AABF-A-3 (Jan 2008) (Symbols, Abbreviations, Terms, Definitions, Mnemonics, Link Control Word Overview and Word Formats)</li> </ul>
	<ul style="list-style-type: none"> <li data-bbox="586 1680 1409 1841">■ <i>Project 25 Conventional Control Messages</i>, TSB-102.AABG (Jul 1996) (Trunked system messages that may be applied to conventional systems: Emergency Alarm, Call Alert, Radio Check, Inhibit, and Uninhibit, Status Update and Request, Message, Telephone Interconnect Dialing, Radio Unit Monitor)</li> </ul>

Table 18: FDMA Trunked Digital Documents—Phase 1 (Continued)

Document Type	Documents
	<ul style="list-style-type: none"> <li>■ <i>Project 25 Conventional Control Messages, Addendum 1 – Individual Telephone Calls</i>, TSB-102.AABG-1 (May 2006) (Control Messages Specifications, Annex A Message Sequence (informative))</li> </ul>
<p><b>Conformance Tests Procedures:</b></p>	<p style="text-align: center;"><b>Compliance Assessment Documents</b></p> <ul style="list-style-type: none"> <li>■ <i>Project 25 Conformance Profile – Level Three Basic Trunked Operation</i>, TIA-NNN.CXXX (CXXX TG or TR8.n approval tbd; TR8.n approval tbd) (Procedure Signaling Parameter and Values, Procedure Signaling (including Control Channel Signaling and Voice Traffic Channel Signaling), and the following Procedures: Network Status Broadcast, RFSS Status Broadcast, Channel Identifier Update, System Services Broadcast, Adjacent Site Broadcast, Full Unit Registration Request, Full Unit Registration Command, Location Update (New LRA), Location Update (Same RA), Single Group Affiliation, Unit to Group Call Setup, Unit to Group Voice Transmission, Unit to Announcement Group Call Setup, Unit to System Group Call Setup, Unit to Unit Call Setup, Group Call Termination, Unit to Unit Call Termination, Emergency Call, Emergency Alarm)</li> <li>■ <i>Project 25 Conformance Profile – Level Four Advanced Trunked Operation</i>, TIA-NNN.CXXX (CXXX TG or TR8.n approval tbd; TR8.n approval tbd)</li> </ul>
<p><b>Performance Measurement Methods:</b></p>	<p>No specific documents planned for FDMA Trunked Digital, but the following document also applies:</p> <ul style="list-style-type: none"> <li>■ <i>Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods</i>, ANSI/TIA-102.CAAA-B (Dec 2004) (Methods of Measurements for Receivers, Transmitters, Trunking Systems, Unit Characteristics)</li> </ul>
<p><b>Performance Recommendations:</b></p>	<p>No specific documents planned for FDMA Trunked Digital, but the following document also applies:</p> <ul style="list-style-type: none"> <li>■ <i>Project 25 Land Mobile Radio Transceiver Recommendations, C4FM/CQPSK Modulation</i>, ANSI/TIA-102.CAAB-B (Jul 2004) (Standards for All Equipment: Receiver Section, Transmitter Section, Trunked System Timing Characteristics, Unit Characteristics)</li> </ul>
<p><b>Interoperability Test Procedures:</b></p>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Interoperability Testing for Voice Operation in Trunked Systems</i>, ANSI/TIA-102.CABC (September 2006) (trunked systems, voice only) (Interoperability Test Procedures: Regular, Queued or Denied, and Announcement Group Call Tests, Protected Traffic Channel Tests, and informative test procedures that are conditional on other trunking documents modification)</li> </ul>

## 5.2.2 Two-Slot TDMA Trunked Digital—Phase 2

**Optional** The following documents provide guidance necessary to meet the optional (mandatory if supporting Two-Slot TDMA Trunked Digital features) Phase 2 P25 Two-Slot TDMA Trunked Digital standard. (Section 1.1.2 describes Phase 2.)

Table 19: Two-Slot TDMA Digital Documents—Phase 2

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 2 Slot TDMA Overview</i>, ***-NNN.XXXX (TDMA TG draft, Jan 2008; TR8.12 approval, Oct 2008) (TDMA Trunking Overview, Voice and Data Services)</li> </ul>
<b>Protocol (Normative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 2 Slot TDMA Common Air Interface – Physical Layer Specification</i>, ***-NNN.XXXX (TDMA TG draft, Jan 2008; TR8.12 approval, Oct 2008) (Modulation, Structure of the Different Types of Bursts, Channel Coding, Time Division Multiplex (TDM) Timing Requirements, and Definition of Scrambling)</li> <li>■ <i>Project 25 Two Slot TDMA Common Air Interface – MAC Layer: Procedures and Messages</i>, ***-NNN.XXXX (TDMA TG, draft, Jan 2008; TR8.12 approval, Oct 2008) (Logical Channels Structure, MAC Protocol Description, MAC Protocol Data Units (PDUs), Physical Layer Services Required by the MAC Layer)</li> </ul>
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Two Slot TDMA Common Air Interface Conformance Tests</i>, ***-NNN.XXXX (TDMA TG draft, Jun 2008; TR8.n approval, Mar 2009)</li> </ul>
<b>Performance Measurement Methods:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Two Slot TDMA Transceiver</i>, ***-NNN.XXXX (TDMA TG draft, tbd; TR8.1 approval, Mar 2009)</li> </ul>
<b>Performance Recommendations:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Two Slot TDMA Transceiver Performance Recommendations</i>, ***-NNN.XXXX (TDMA TG, tbd; TR8.6 approval, Mar 2009)</li> </ul>
<b>Interoperability Test Procedures:</b>	(No documents currently under development)



## 6 Suite of Standards for Project 25 Equipment

This section discusses the suite of standards documents for the (currently) five equipment types of a P25 system. For each of the equipment types, a table is provided to identify the documents that have been approved by TIA for publication. Once in publication, the documents are to be used by manufacturers to design, develop, and offer products to the public safety community that meet the P25 system standards. Similarly, public safety users can identify the TIA-published documents in their RFPs of P25 systems to ensure that the products to be purchased are associated with the approved P25 standards.

P25 radio equipment must meet certain performance standards set by spectrum regulators and by P25 system designers to ensure the radio equipment will behave predictably and act as good neighbors with nearby systems. The required performance will depend upon the modulation and access method used by the system. Further, the P25 radio equipment is expected to meet standards for audio tones and audio interfaces. The next sections relate to the various configurations.

### 6.1 Analog FM Transceivers—Phase 1

**Mandatory** The following documents provide guidance necessary to meet the mandatory P25 Phase 1 Analog FM Transceiver standard, which provides backward compatibility with non-P25 radio systems. (Section 1.1.2 describes Phase 1.)

Table 20: Analog FM Transceiver Documents—Phase 1

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	(No documents are necessary or applicable)
<b>Protocol (Normative):</b>	(No documents are necessary or applicable)
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	(No documents are necessary or applicable)
<b>Performance Measurement Methods:</b>	<ul style="list-style-type: none"> <li>■ <i>Land Mobile FM or PM Communications Equipment Measurement and Performance Standards</i>, ANSI/TIA-603-C (Dec 2004) (Methods of Measurement for Receivers, Transmitters, Unit Characteristics, and Subaudible Signaling.)</li> </ul>
<b>Performance Recommendations:</b>	<ul style="list-style-type: none"> <li>■ <i>Land Mobile FM or PM Communications Equipment Measurement and Performance Standards</i>, ANSI/TIA-603-C (Dec 2004) (Standards for Receivers, Transmitters, Unit Characteristics, and Subaudible Signaling.)</li> </ul>
<b>Interoperability Test Procedures:</b>	(No documents are necessary or applicable)

## 6.2 Digital Project 25 Phase 1 Transceivers

**Mandatory** The following documents provide guidance necessary to meet the mandatory P25 Phase 1 Transceiver standard. (Section 1.1.2 describes Phase 1.)

Table 21: Digital Phase 1 Transceiver Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	(No documents are necessary or applicable)
<b>Protocol (Normative):</b>	(No documents are necessary or applicable)
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	(No documents are necessary or applicable)
<b>Performance Measurement Methods:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods</i>, ANSI/TIA-CAAA-B (Oct 2004) (Methods of Measurements for Receivers, Transmitters, Trunking Systems, Unit Characteristics)</li> </ul>
<b>Performance Recommendations:</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Land Mobile Radio Transceiver Recommendations, C4FM/CQPSK Modulation</i>, ANSI/TIA-CAAB-B (Jul 2004) (Standards for All Equipment: Receiver Section, Transmitter Section, Trunked System Timing Characteristics, Unit Characteristics)</li> </ul>
<b>Interoperability Test Procedures:</b>	(No documents are necessary or applicable)

## 6.3 Digital Project 25 Phase 2 Transceivers

**Optional** The following documents provide guidance necessary to meet the optional (mandatory if supporting Digital P25 Phase 2 Digital Transceiver features) Digital P25 Phase 2 Transceiver standard. (Section 1.1.2 describes Phase 2.)

Table 22: Digital Phase 2 Transceiver Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	(No documents are necessary or applicable)
<b>Protocol (Normative):</b>	(No documents are necessary or applicable)

Table 22: Digital Phase 2 Transceiver Documents (Continued)

Document Type	Documents
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	(No documents are necessary or applicable)
<b>Performance Measurement Methods:</b>	<ul style="list-style-type: none"> <li>■ <i>Public Safety 2-Slot TDMA Transceiver Measurement Methods, ***-NNN-XXXX (XXXX TG or TR8.n approval tbd; TR8.n approval tbd)</i> (Methods of Measurements for Receivers, Transmitters, Unit Characteristics)</li> </ul>
<b>Performance Recommendations:</b>	<ul style="list-style-type: none"> <li>■ <i>Public Safety 2-Slot TDMA Transceiver Recommendations, ***-NNN-XXXX (XXXX TG or TR8.n approval tbd; TR8.n approval tbd)</i> (Standards for All Equipment: Receiver Section, Transmitter Section, Unit Characteristics)</li> </ul>
<b>Interoperability Test Procedures:</b>	(No documents are necessary or applicable)

## 6.4 Mobile Radio Push-to-Talk and Audio Interface

**Optional**      The following documents provide guidance necessary to meet the optional (mandatory if supporting Push-to-Talk and Audio Interface features) P25 Push-to-Talk and Audio Interface standard.

Table 23: Mobile Radio Push-to-Talk and Audio Interface Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
<b>Overview (Informative):</b>	(No documents are necessary or applicable)
<b>Protocol (Normative):</b>	<ul style="list-style-type: none"> <li>■ <i>Project 25 Mobile Radio Push-to-Talk and Audio Interface – Definitions and Methods of Measurement, TSB-102.CAAC (Sep 2002)</i> (Physical and Electrical Interfaces, Standard Test Conditions, and Methods of Measurement)</li> </ul>
<b>Compliance Assessment Documents</b>	
<b>Conformance Tests Procedures:</b>	(No documents are necessary or applicable)
<b>Performance Measurement Methods:</b>	<p>No specific documents planned for Mobile Radio Push-to-Talk and Audio Interface, but the following documents also applies:</p> <ul style="list-style-type: none"> <li>■ <i>Project 25 Mobile Radio Push-to-Talk and Audio Interface – Definitions and Methods of Measurement, TSB-102.CAAC (Sep 2002)</i> (Physical and Electrical Interfaces, Standard Test Conditions, and Methods of Measurement)</li> </ul>

Table 23: Mobile Radio Push-to-Talk and Audio Interface Documents (Continued)

Document Type	Documents
Performance Recommendations:	(No documents are necessary or applicable)
Interoperability Test Procedures:	(No documents are necessary or applicable)

## 6.5 Audio Tone Signaling

**Optional** The following documents provide guidance necessary to meet the optional (mandatory if supporting Audio Tone Signaling features) P25 Audio Tone Signaling standard.

Table 24: Audio Tone Signaling Documents

Document Type	Documents
<b>Description and Specification Documents</b>	
Overview (Informative):	(No documents are necessary or applicable)
Protocol (Normative):	<ul style="list-style-type: none"> <li>■ <i>Project 25 Mobile Audio Tone Signaling Definition and Requirements, TIA-102.CAAD</i> (Ballot and publish, expected 2006)</li> </ul>
<b>Compliance Assessment Documents</b>	
Conformance Tests Procedures:	(No documents are necessary or applicable)
Performance Measurement Methods:	(No documents are necessary or applicable)
Performance Recommendations:	(No documents are necessary or applicable)
Interoperability Test Procedures:	(No documents are necessary or applicable)

## 7 Project 25 Decision Charts

---

---

Use the decision charts in this section to find the P25 standards relevant to a given public safety communications component.

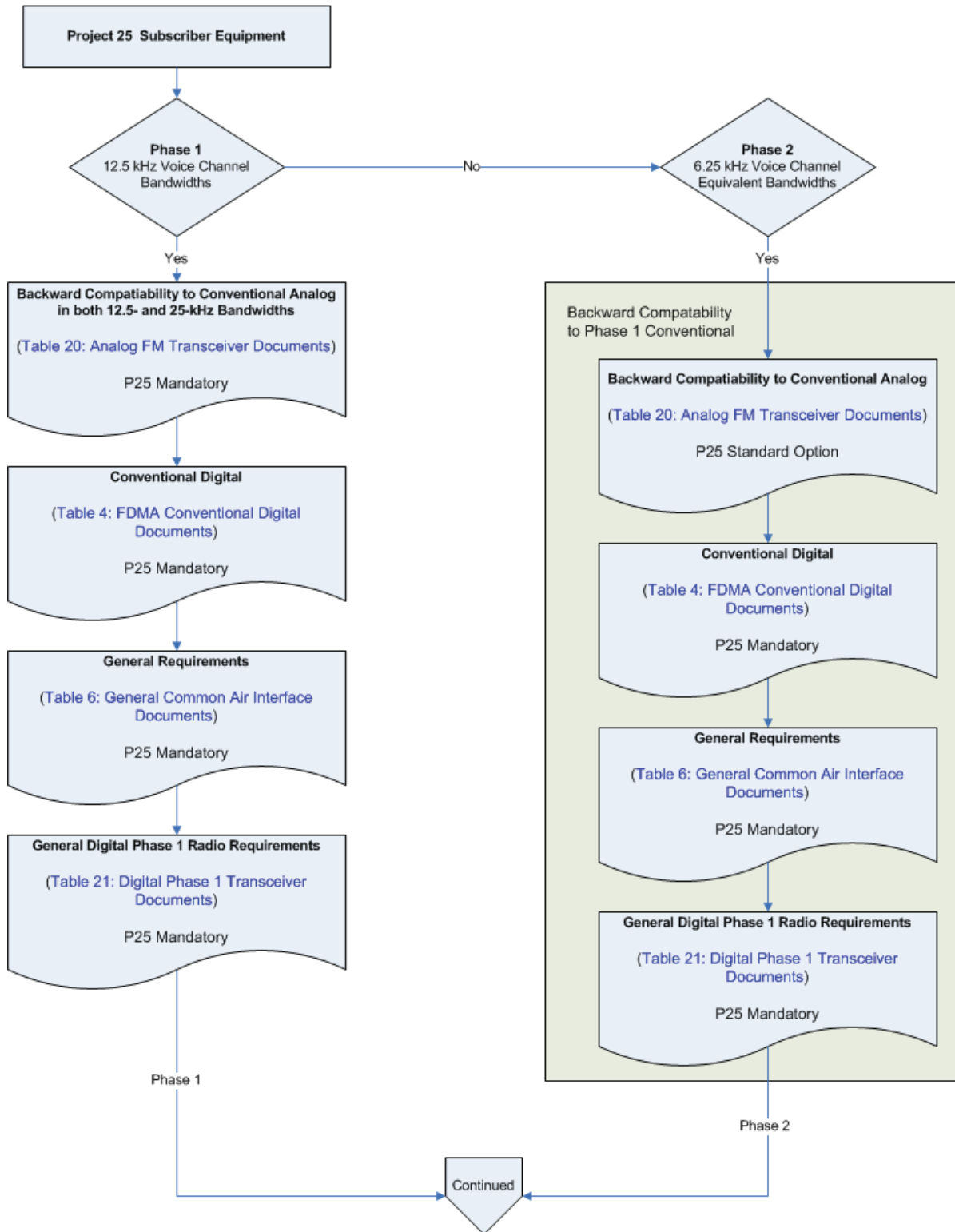
The P25 decision charts span over the next several pages. Graphical arrows denote a break to the next page or a continuation from the previous page.

***Note: In the decision charts, click a table's title to jump to that table in this document.***

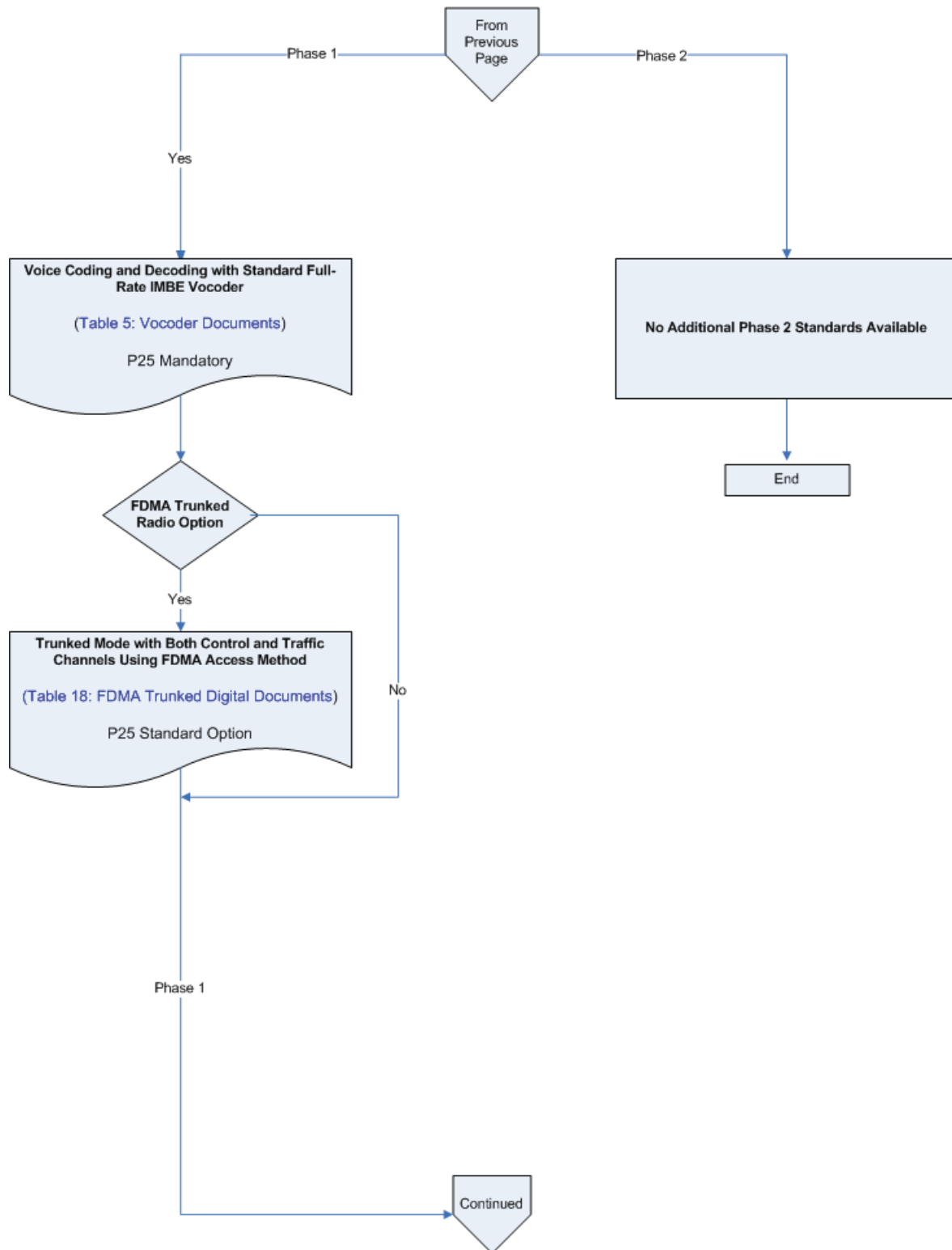
See [Section 2.2, “Legend for P25 Standards Document Status,”](#) on page 7 for information about the identifier convention used for document names.

# 7.1 Project 25 Subscriber Equipment

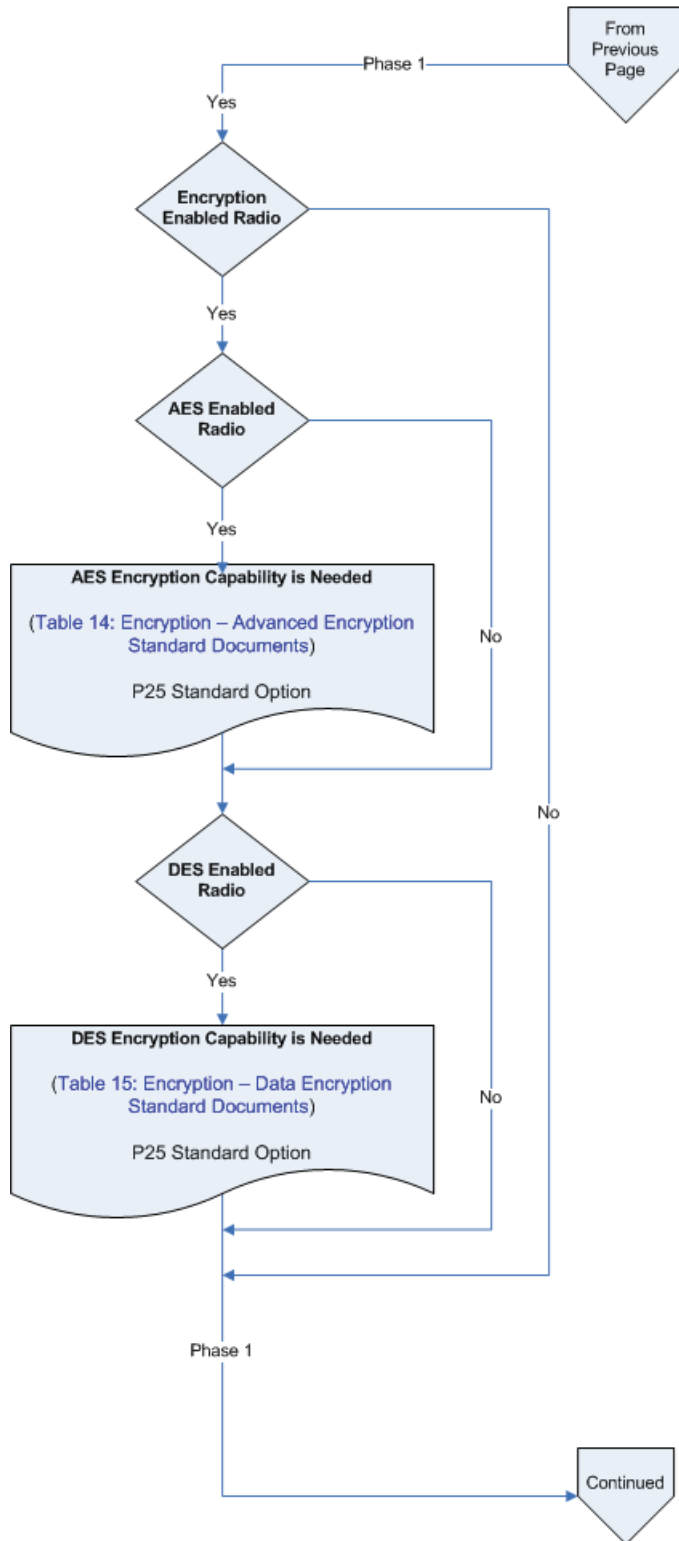
## 1. Project 25 Subscriber Equipment



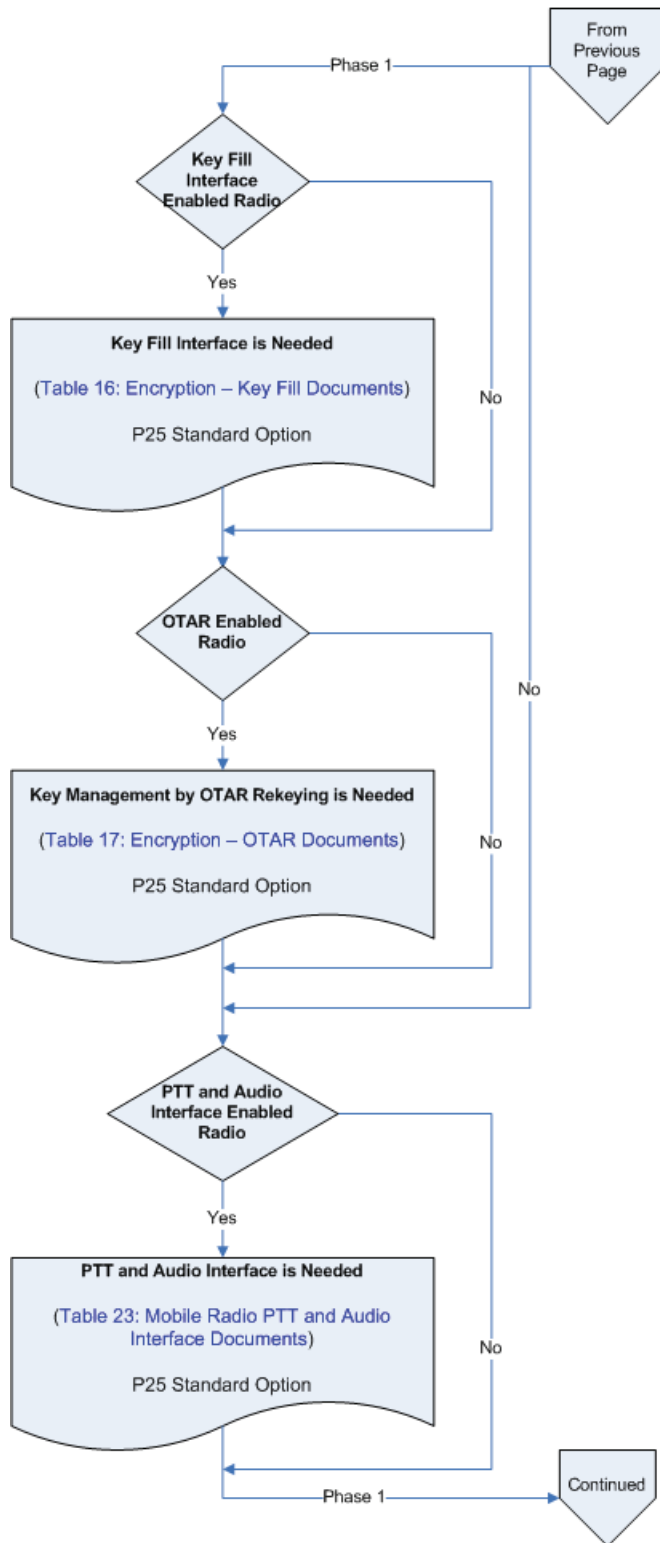
1. Project 25 Subscriber Equipment (continued)



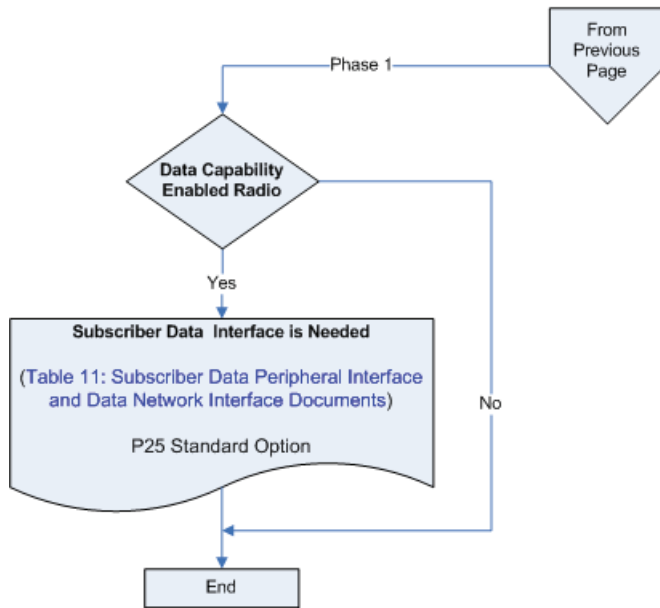
1. Project 25 Subscriber Equipment (continued)



1. Project 25 Subscriber Equipment (continued)

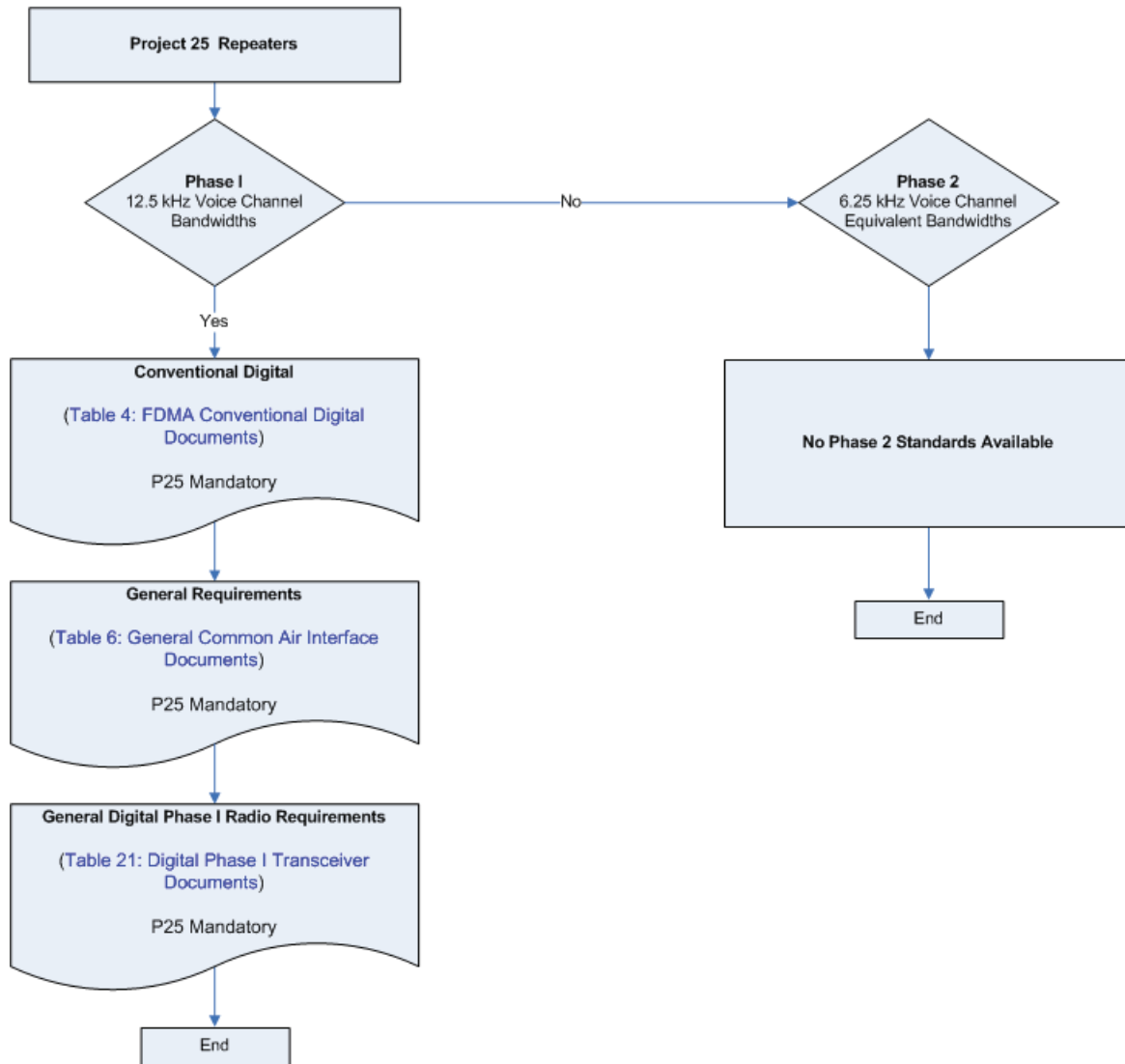


1. Project 25 Subscriber Equipment (continued)



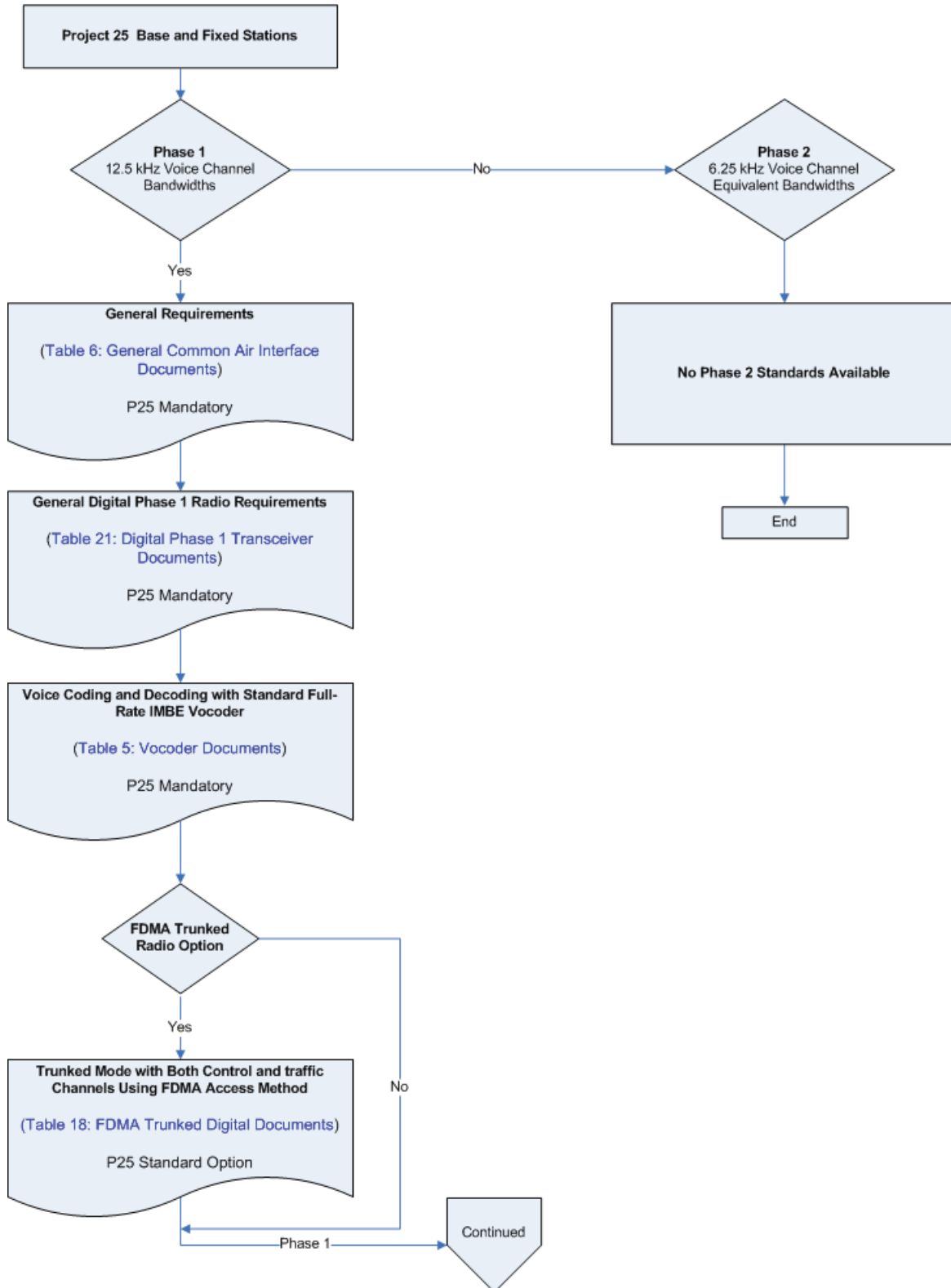
## 7.2 Project 25 Repeaters

2. Project 25 Repeaters

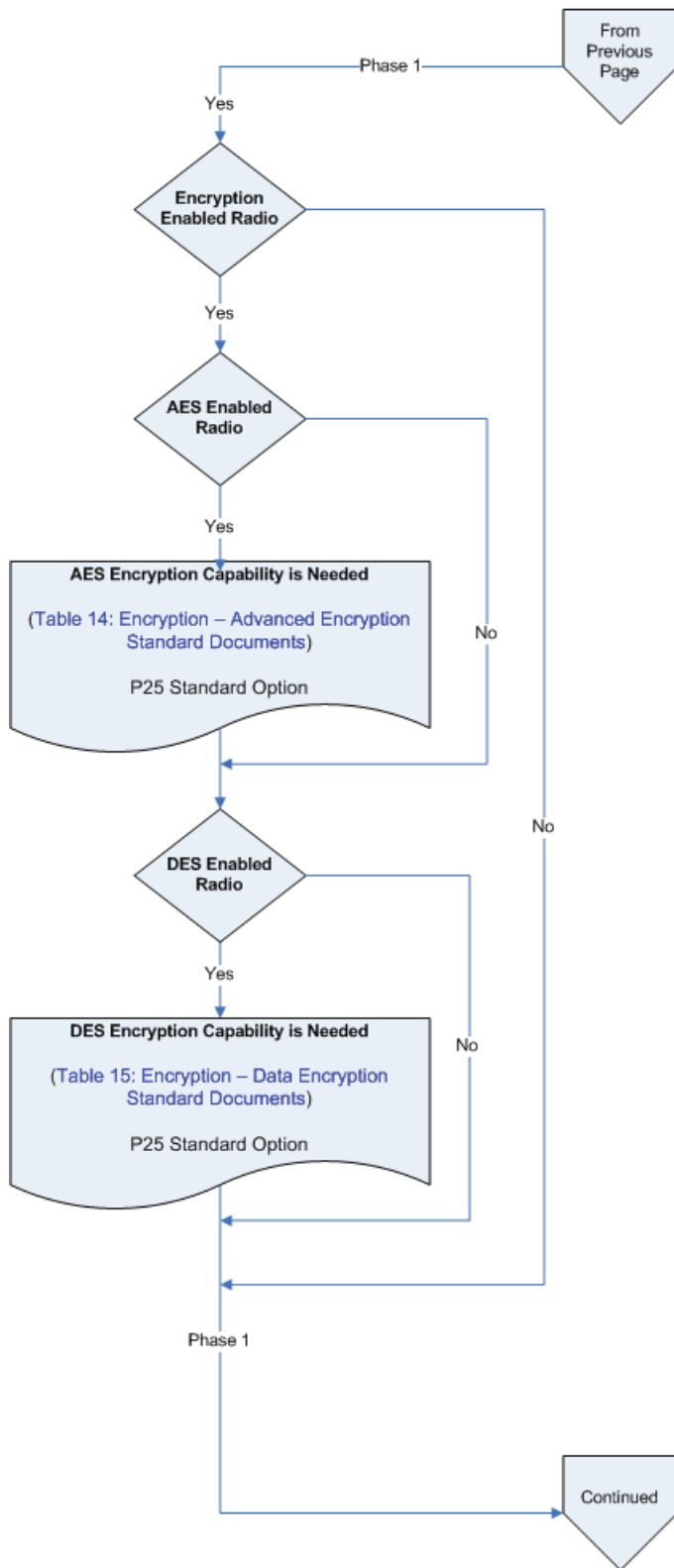


## 7.3 Project 25 Base and Fixed Stations

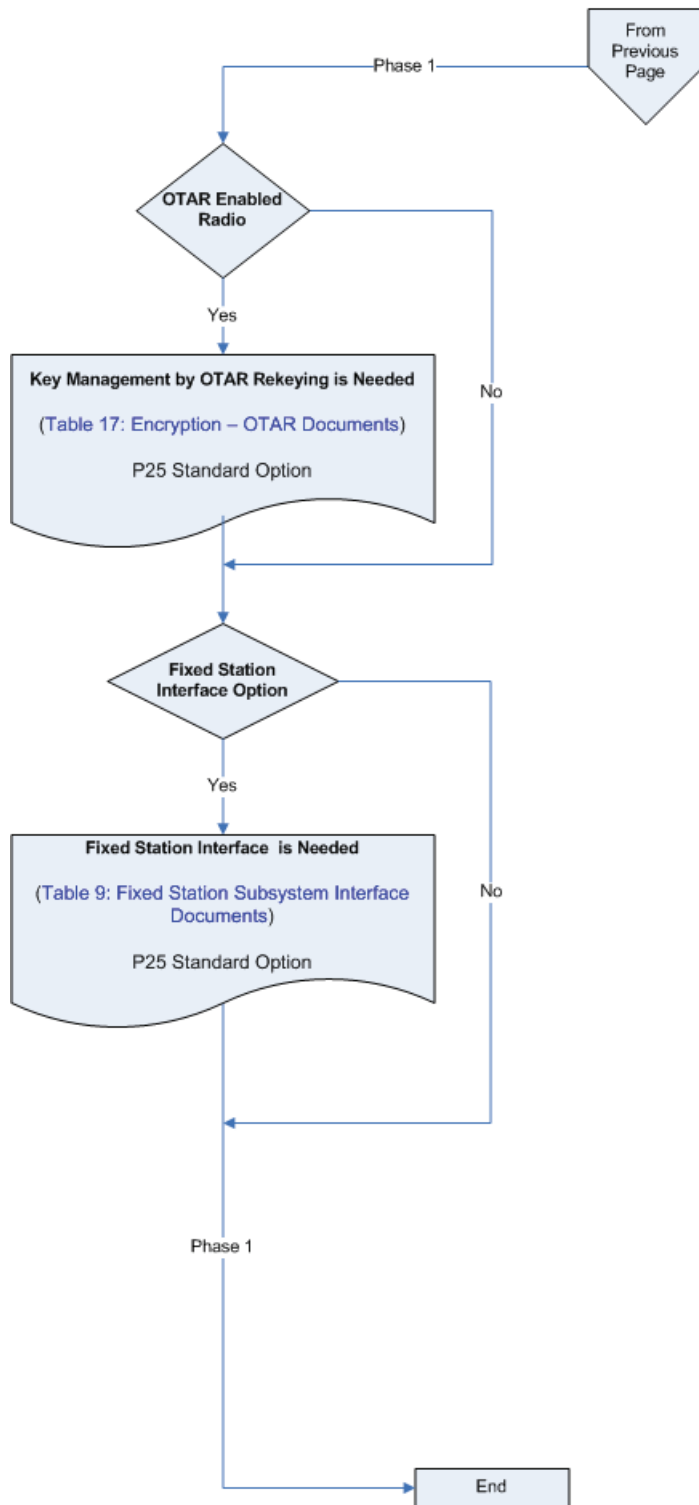
### 3. Project 25 Base and Fixed Stations



3. Project 25 Base and Fixed Stations (continued)

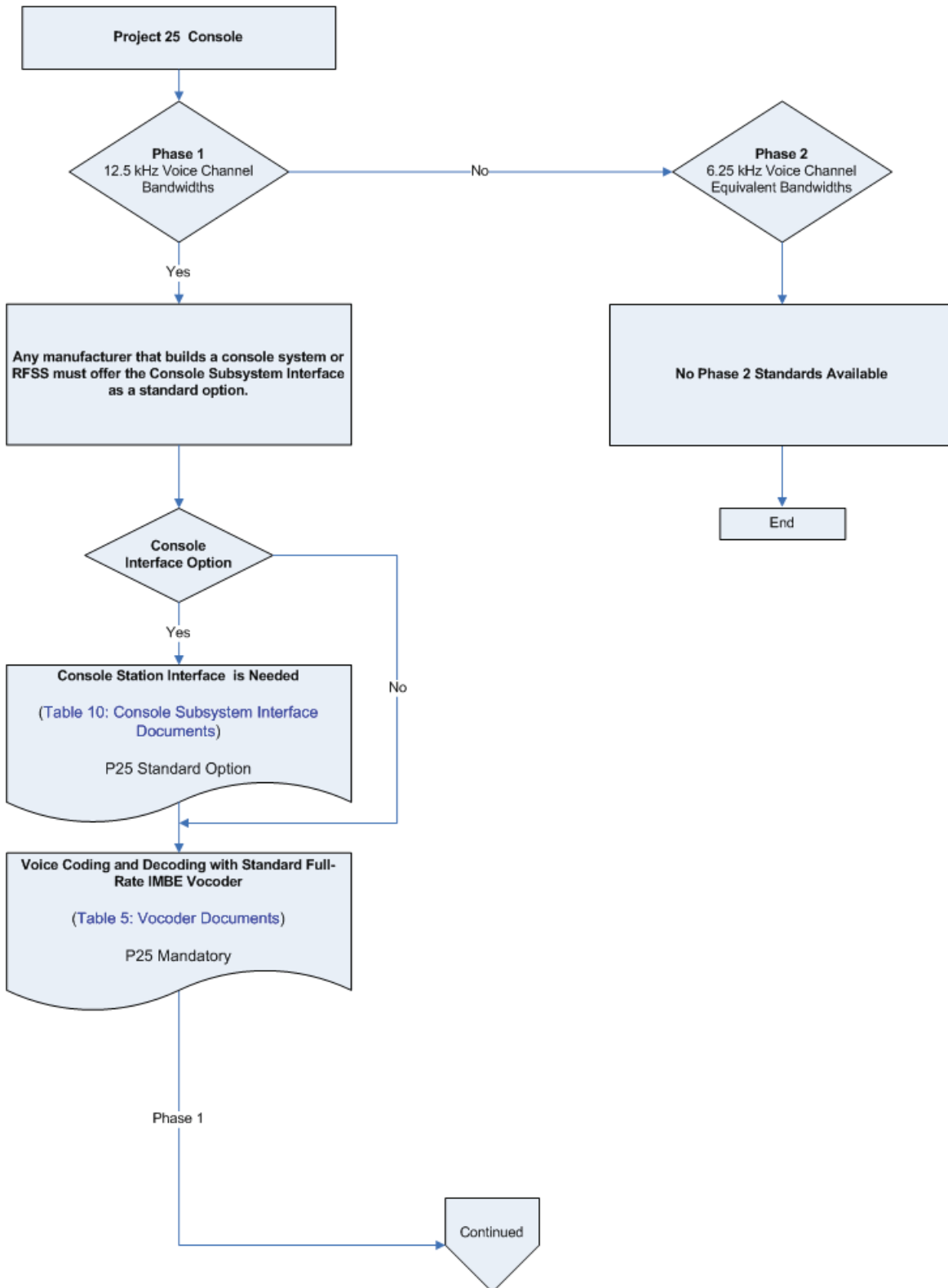


3. Project 25 Base and Fixed Stations (continued)

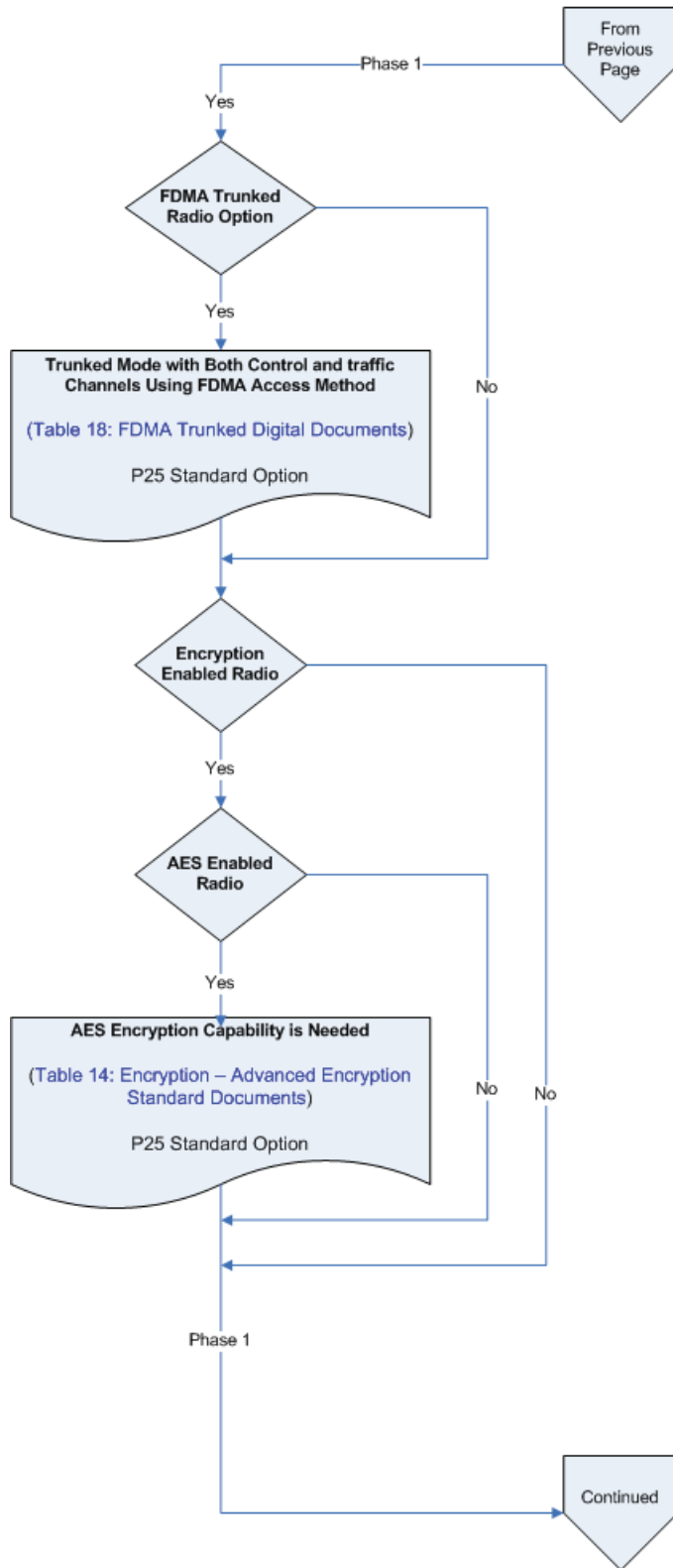


## 7.4 Project 25 Console

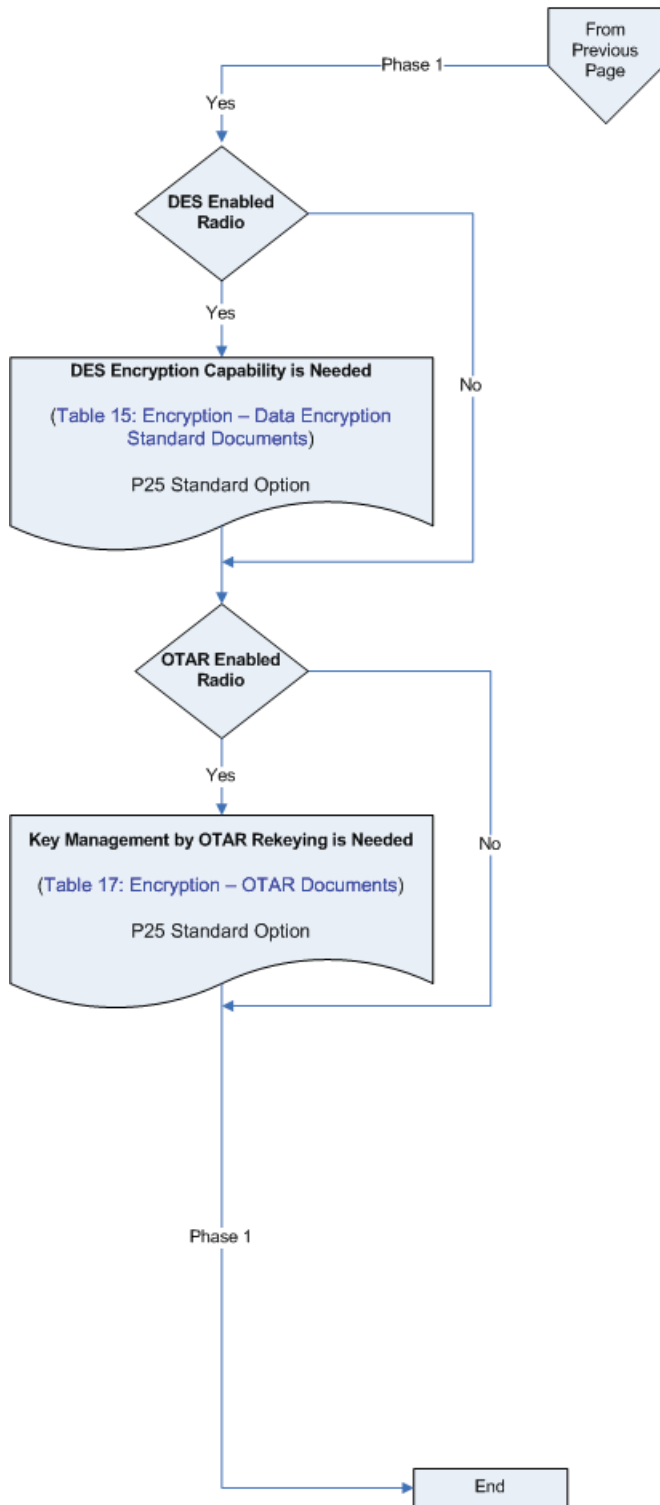
### 4. Project 25 Console



4. Project 25 Console (continued)

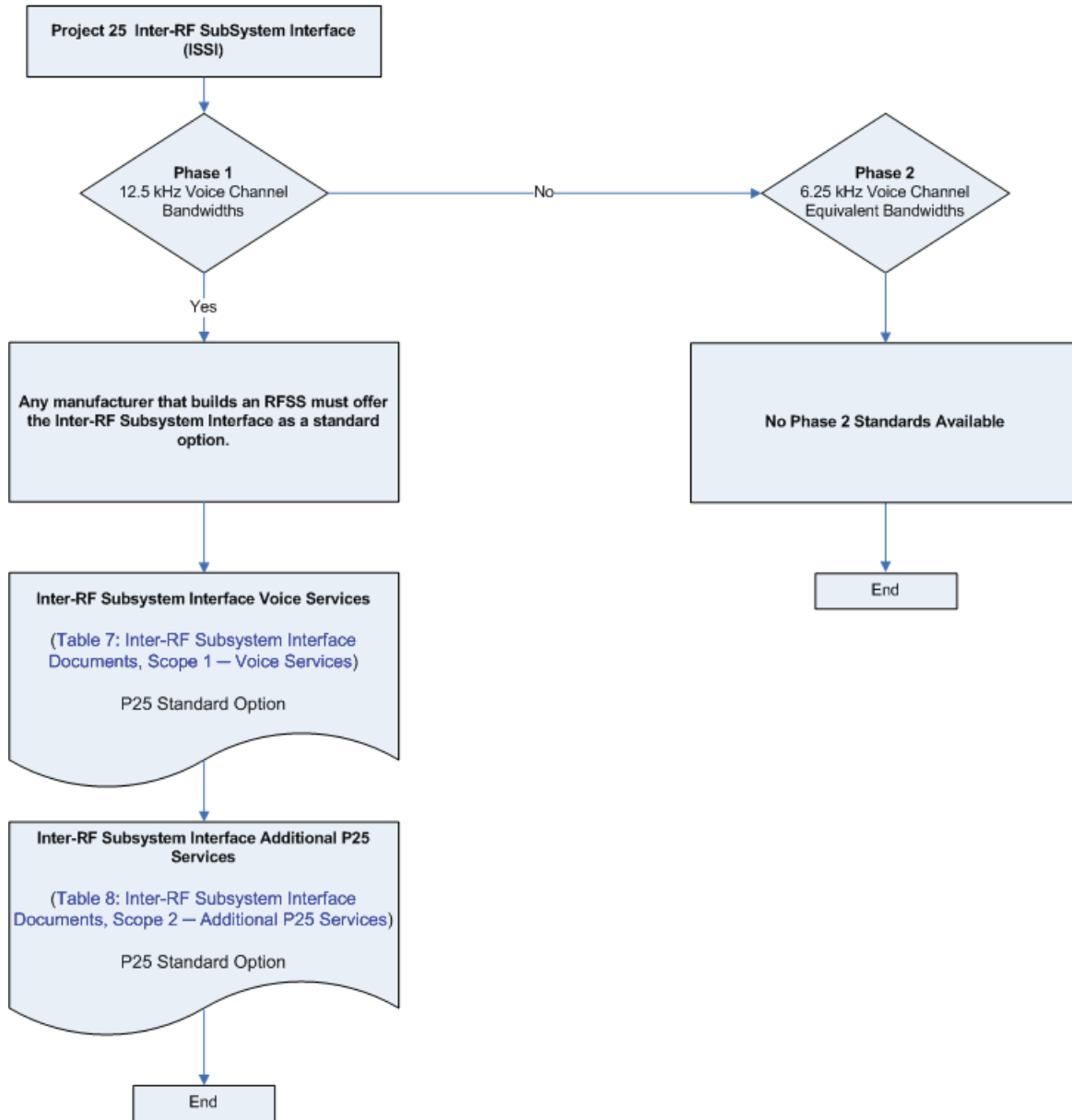


4. Project 25 Console (continued)



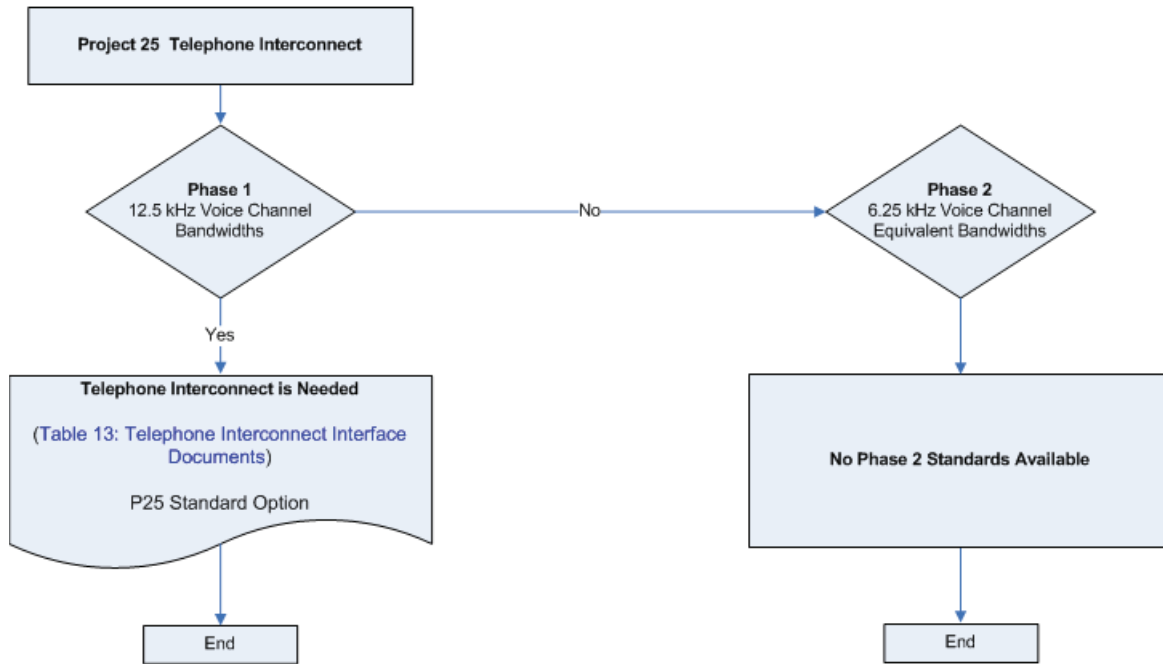
## 7.5 Project 25 Inter-RF Subsystem Interface

### 5. Project 25 Inter-RF Subsystem Interface



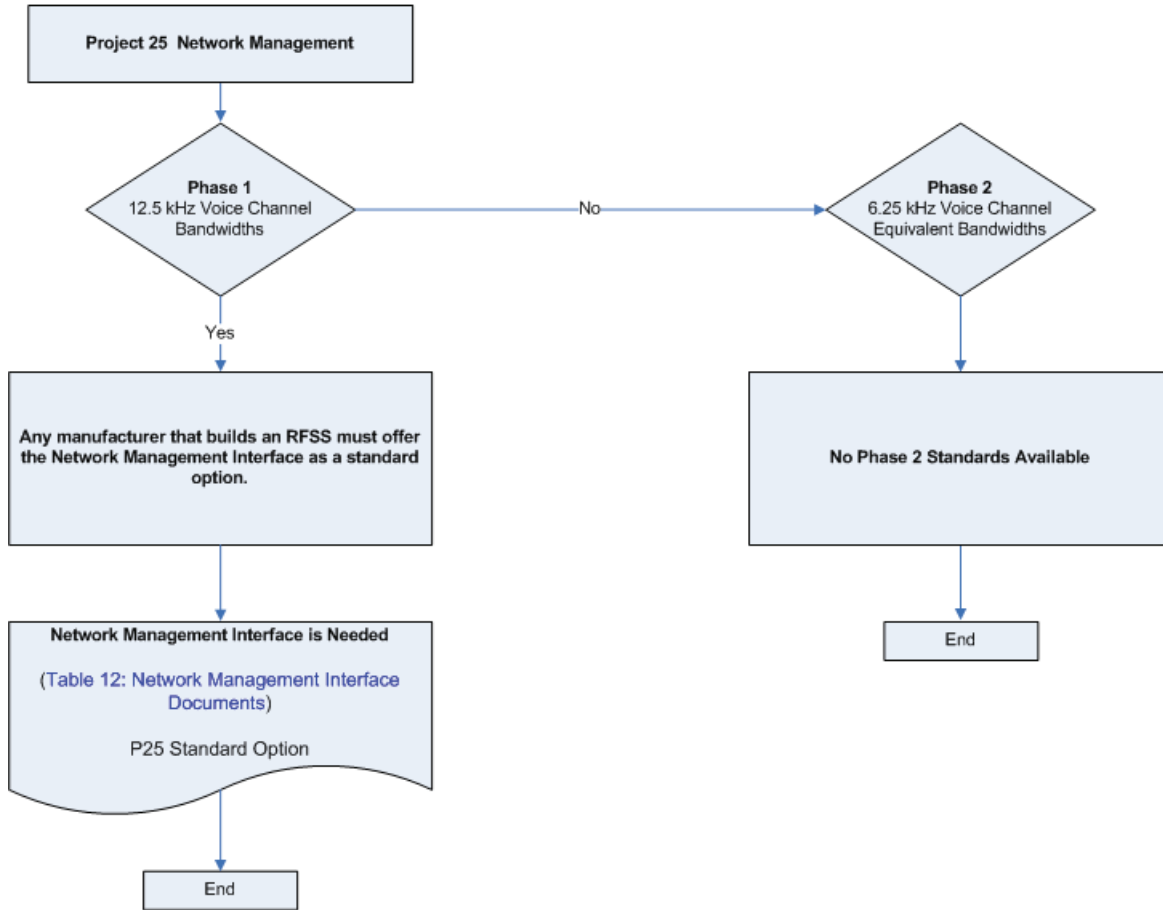
## 7.6 Project 25 Telephone Interconnect

### 6. Project 25 Telephone Interconnect



## 7.7 Project 25 Network Management

### 7. Project 25 Network Management



## 7.8 Project 25 Data Network

### 8. Project 25 Data Network

