Project 25 Technology Interest Group

Project 25 Frequently Asked Questions (FAQ) Version 1.5 June 2018

	Question	Answer
	P25 Standards Overview	
1.	Where can I view the latest list of P25 Standards Documents available?	The www.project25.org homepage has a direct link to the current list of P25 Steering Committee approved P25 Standards documents.
2.	Where can I get a copy of P25 Standards documents?	Copies of the Standards are free to Government Agencies in the United States. Follow this link for an application form: http://standards.tiaonline.org/all-standards/p25-downloads-application Documents for Commercial Entities can be ordered at: https://sites.tiaonline.org/standards-committees/tr-8/
3.	Where can I view the latest Changes and Updates to the P25 Standards and future work in progress?	The www.project25.org homepage has a direct link to a report on the latest P25 Standards update from the most recent TIA TR-8 meetings. The site also has a link to the current list of P25 Steering Committee approved P25 Standards documents.
4.	Are supplementary services in the P25 Standard available with multi-vendor offerings?	Yes. Refer to the PTIG Capabilities Guide available at Project25.org for a list of Supplementary Services covered by published TIA-102/P25 standards. Consult vendors for their specific offerings.
5.	What is the P25 Statement of Requirements (SoR)	The P25 Statement of Requirements is a document developed and managed by the P25 User Needs committee. This committee is made up of Public Safety and Government practitioners, and it is open to participation by P25 product suppliers and consultants. The SoR is a living document that includes the operational requirements and features requested by the user needs sub-committee. Many are reflected in the

		existing P25 Suite of Standards, while others are for consideration in future P25 Standards development.
6.	How do I find which operational requirements and features are covered in the P25 Suite of Standards?	Refer to the PTIG Capabilities Guide available on the Project25.org home page. This comprehensive guide lists all features and capabilities currently covered by the P25 Standards. The most common differentiator for both subscriber and infrastructure equipment is the air interfaces. This guide groups the listed equipment capabilities by the currently available standardized air interfaces: FDMA Conventional, FDMA Trunking, and TDMA Trunking. The Capabilities Guide also includes a section for Fixed Network Equipment-Trunked ISSI/CSSI (voice and non-voice services) and Fixed Network Equipment-FDMA Conventional-Fixed Station Control & Voice Services.
7.	How are P25 Standards documents created?	The P25 Standard is a collection of documents and standards adopted by the P25 Steering Committee. The TIA-102 series of standards makes up the bulk of the P25 Standard. To date, all documents included in the suite of P25 Standard Documents are created and maintained by the TIA TR-8 Engineering Committee. Creating a new P25 Standard document typical results from a sequential, but iterative, process between TIA TR-8 and P25 users as described below: • User Needs Sub-committee Statement of Requirements (SoR) identifies a need for a standard to enable interoperability of some "feature" • APIC Task Group (combination of users and manufacturers) develops a draft Standard • The associated TIA TR-8 Subcommittee prepares an official TIA-102 standard for publication based on the APIC draft • Project 25 Steering Committee adopts the TIA Standard as part of the suite of P25 Standards TIA publishes and maintains the TIA-102 standard
8.	What is the status of the P25 Phase 2 Standard suite?	The standard for Trunked TDMA Voice Channel operation is complete. A standard for TDMA Trunked Control Channel operation is in progress. Standards for TDMA Trunked

		Data Channel operation, TDMA Conventional Voice Channel operation and TDMA Conventional Data Channel operation are all future work items for P25/TIA TR8.
9.	What is the status of P25 Phase 2 equipment availability?	TDMA trunked voice is working in systems today for multiple vendor subscriber units.
10.	When will the P25 Standard be complete?	To address the evolving needs of users, and changing FCC/NTIA requirements, the P25 Standards must continually be updated to satisfy those revised requirements. The P25 Standard will continue to evolve with new specifications and clarifications that will resolve interoperability issues, add additional features, offer improved performance, add security upgrades, offer new testing specs, and create additional interfaces.
	P25 Compliance Testing	
11.	What is going on with the Compliance Acceptance Program (CAP) testing for Project 25 equipment?	DHS OIC is updating and renewing the P25 CAP Testing program. An Advisory Panel (AP) has been established replacing the Governing Board and new 2016 and 2017 Compliance Assessment Bulletins (CABs) have been posted. A number of P25 Test Laboratories have been certified for CAP testing based on the 2016-released CABs. Testing based on the 2010 CABs is available in currently recognized labs but Any SDoCs/STRs from testing done using the 2010 CABs will need to be re-submitted based on the 2016 CABs by the end of February 2018. The new CABs include additional tests. Previous testing does not need to be repeated for cases where the subject equipment has not changed and the test itself has not changed. Information and details about P25 CAP testing and the 2016 CABs can be found at https://www.dhs.gov/science-and-technology/p25-cap.
12.	Where can I view CAP testing results	P25 CAP testing results are posted on the DHS P25 website. (https://www.dhs.gov/science-and-technology/p25-cap). All the previously published and new Suppliers' Declaration of Compliance (SDoCs) documentation and

		Summary Test Reports (STR) can be found at this site. If there are questions about any documentation, please send the questions to P25CAP @hq.dhs.gov .
13.	Are CAP tested products "Certified" to meet P25?	The word "Certified" is not used in the description of CAP testing by DHS, NIST, TIA, or the PTIG member companies. A more appropriate statement would be: "The posting of SDoCs & STRs on the DHS OIC P25 CAP website means that the referenced products have been tested for specific features, functions and services listed in the P25 CAP Summary Test Report (STR), validated by a P25 CAP recognized P25 Test laboratory and approved by DHS OIC to be posted on the DHS OIC P25 CAP website https://www.dhs.gov/science-and-technology/p25-cap. If the SDoC and STR documents are not posted on the DHS website, they have yet to be approved by DHS OIC.
14.	How are P25 Test Documents created?	P25 Test standards are typically created along with the associated P25 standard in TIA sub-committees.
15.	What are RCATs ?	"RCATS are TSBs, Telecommunications Systems Bulletins, and as such, are recommendations and not standards. The following describes how RCATS, Recommended Compliance Assessment Test, are created. • RCAT drafted by the creators of the associated TIA Standards with Industry lead and consultation with User Agency representatives. • Project 25 Steering Committee adopts the TIA RCAT TSB as part of the suite of P25 Standards. • TIA publishes and maintains the P25 RCAT TSB. • P25 Steering Committee forwards P25 RCAT TSB to the DHS Compliance Assessment Program (CAP) Advisory Panel (AP) for consideration during Compliance Assessment Bulletin (CAB) creation or modification.

16.	What are CABs ?	The Compliance Assessment Bulletins (CABs) are the official documents used in P25 CAP Test laboratories for testing. CABs are published by DHS OIC.
	Benefits of P25	
17.	Is Project 25 Public Safety Grade?	Yes, for a number of reasons including: - 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. - Multi-vendor solutions enabling interoperability exist offering Public Safety agencies competition and options for cost effective sourcing.
18.	What are the benefits of using P25 radio equipment on the Fire ground?	Benefits of using P25 mission critical radio equipment on the Fire ground include: - The dual-rate vocoder developed for P25 Phase 2 included improved performance in background noise. Manufacturers have also added background noise reduction algorithms to their radio products in addition to the vocoder improvements. P25 equipment can achieve 10 to as much as 25 dB improvements in background noise reduction. - Tone Signaling – DTMF, Knox and single tone is now supported in the vocoder.

		• Improved Coverage – P25 Phase 1 technology is about +7dB better than 25 KHz Analog. • Enhanced Signaling – Talking Party ID, Group Calls, Unit-to-Unit Calls, All Calls, Emergency Alerts, Emergency Calls, Call Alerts, Radio Check, Radio Unit Monitoring and others. • Manufacturers have developed P25 Pagers and have added Integrated GPS receivers to provide location information.
19.	What is the difference between Automatic roaming and Manual roaming in a P25 System?	From the perspective of the user, "automatic roaming" refers to the radio's ability to move from the coverage of one RF site, or system to another without user intervention (or often even user knowledge). The user's radio automatically knows when coverage is degrading, it automatically searches for better coverage, and then automatically switches and registers with the new RF site's control channel. Alternatively, "manual roaming" from the user's perspective requires the user to physically select the new site, or system using radio control methods (i.e. menu, selector, etc.). The radio then tunes to the newly selected site frequency and attempts to register on the new RF site's control channel. Identity management programming for the roaming radios and infrastructure is key to successful reliable roaming. A Whitepaper on P25 Roaming and Identity Management is available at http://www.project25.org/
	P25 Interoperability	
20.	We are going to a new P25 system in our rural area. All of the systems around us are conventional analog. How can we interoperate?	A variety of manufacturers offer interoperability products and consoles that provide hard and soft patches between conventional analog and P25 trunking. Other network vendors also support mapping from conventional to trunking user groups without patching. See the PTIG WEB project25.org Member tab for a full range of solutions.

21.	A new P25 system is building out in my region. I have a P25 radio, how do I get access?	The systems operator of your regional P25 network is the key to access for new users. Most have standard policies and procedures to accomplish this. Call them to understand the things that can affect your ability to get access: Radio programming policy, frequency band used by the system, if the system is a P25 Phase 1 or P25 Phase 2 system, and what the rev level is for the systems trunking software.
22.	How do I migrate my old analog proprietary trunking system to P25	A variety of P25 consultants exist to assist your organization in capturing user needs and defining options that are both operationally and commercially in your organizations best interest. A variety of manufacturers offer interoperability products, network bridges and patches. Other network vendors also support mapping from conventional to trunking user groups without patching. See the PTIG WEB project25.org Member tab for a full range of solutions.
23.	We want to talk to a neutral party about P25 interoperability issues between different vendors. Who can help?	Contact the PTIG director who will query the involved vendors for possible solutions. mailto:director@project25.org. A variety of P25 consultants exist to assist you.
	P25 Multi-Vendor Solutions	
24.	What do I need to consider to get multiple portable and mobile radio vendors on a P25 System?	This is ultimately up to the system operator but in general, radios must operate in the frequency band used for the system. In addition, the subscriber unit features offered should be compared to the features required within the system. When offered features, match required features, requesting interoperability test data from the specific manufacturers is recommended. Project 25 Phase 1 Subscriber compatibility and Interoperability for different vendors and different software revision levels can be confirmed using CAP test data found on the DHS WEB. https://www.dhs.gov/science-and-technology/p25-cap Contact potential vendors to confirm their position on interoperability with other P25 products and systems.

		Best results for interoperability and sharing occur when the radios are programmed to offer common channel/Talk group names and zone architecture. Enabled features should be consistent when possible, all features do not have to be offered to all user groups.
25.	Are there any examples of P25 systems on the air today with multiple vendor subscriber units approved for operation on the system?	PTIG members have identified over 2100 (1299 Conventional and 842 Trunking) P25 Systems on the air today, and more are in the planning stage. Many have multiple vendor's P25 subscriber units approved for use on their systems. Alaska, Wyoming, Dallas/Fort Worth, The City of Wichita, and Lancaster County PA are just a few examples of systems using multiple subscriber units.
26.	I currently am on a conventional analog system. A new P25 trunking system is available in my area. What choices do I have for subscriber units that will work with both?	The P25 Statement of Requirements states that support of analog is mandatory for Phase 1 radios and optional for Phase 2 radios. Phase 1 subscriber units typically include backward compatibility to analog operation. If your system and the P25 system are in the same frequency band you can choose a single band radio. P25 Multi band radios are available for interoperability between systems with different frequency bands (example 700/800 MHz trunking to VHF 136-174 MHz conventional). In addition, Interoperability products can create hard patches between conventional analog and P25 trunking. Other network vendors also support mapping from conventional to trunking user groups without patching. See the PTIG WEB project25.org Products Tab: http://www.project25.org/index.php/products/products-and-services for a full range of solutions.
27.	Why do we have a P25 system but my system operator says we can only buy one brand of radio?	Many agencies are currently operating with products from multiple vendors on the open P25 Standard. There are 15 infrastructure suppliers and 13 subscriber unit suppliers building Project 25 interoperable equipment. If you can buy only one brand it may be because it is the policy of your system operator based on the economics of maintaining multiple brands of equipment. Or, it may be that you have manufacturer

		specific features or capabilities in your system that are offered by only one vendor and are not covered by the Project 25 suite of standards.
28.	Are there any examples of P25 system infrastructure from different vendors linked to make a single system?	Yes. Examples include………… A Dallas/Fort Worth 700 MHz "overlay" uses Harris and Motorola subsystems linked using the P25 ISSI interface. A number of similar deployments are in place or in planning including in Florida, Oklahoma and southern Texas. The Motorola Front Range Communications Consortium (FRCC) network is linked to the Airbus DS Communications network in Westminster, CO via the Project25 ISSI. The Airwave P25 Solution Centre in Melbourne Australia, uses the P25 ISSI to connect Tait and Etherstack Networks. The Idaho National Labs system use the ISSI to connect an Etherstack P25 network to a Harris P25 network.
29.	If I have one manufacturer's P25 trunked RF Subsystem (RFSS), can I use a different manufacturer's consoles?	Yes, if your RFSS includes a Console Subsystem Interface (CSSI). As long as the RF and the console manufacturer's systems both support the P25 CSSI, you can pick whichever RFSS and Console System that best suits your needs. However, it is prudent to consult with both manufacturer's to verify their prior integration testing and to verify the supported P25 features. Consult the new Project 25 Capabilities Guide for a list of capabilities supported by the CSSI.
30.	Are there real-life examples of P25 Trunked RF Subsystems from one manufacturer being connected to a console system of another manufacturer using the P25 CSSI?	Yes. Monmouth County NJ uses Zetron consoles to manage a Motorola Phase 2 Trunked network. A variety of Energy Companies have connected consoles from Pantel, Avtec, Exacom, IDS and Zetron to an Etherstack P25 network. The Airwave P25 Solution Centre in Melbourne Australia, uses networks connected individually to a Zetron console system via CSSI. Within the network environment Tait/ Icom/ Codan base stations are used. The trunked networks are usually located in Sydney, the ACOM equipment for the Zetron console is located in Brisbane.

31.	If I am connecting to a single manufacturer's P25 Conventional RF Subsystem (RFSS) or Conventional Console Subsystem (CSS) can I connect a base station or repeater from a different manufacturer?	Yes, if your RFSS/CSS provides a Conventional Fixed Station Host and the Fixed Station manufacturer supports the Digital Fixed Station Interface (DFSI). See *TIA-102.BAHA - Fixed Station Interface* for further information.
32.	"If I have one manufacturer's P25 trunked RF Subsystem (RFSS) and want to add additional RF Subsystems to expand my system, Can I use RF Subsystems from a different manufacturer?"	Yes, If your current and future RFSSs can support an ISSI Interface. However, it is prudent to consult with both manufacturers to verify their prior integration testing and to verify the supported P25 features.
	P25 Encryption	
33.	What Security interfaces and services are currently covered by the P25 standard?	AES Encryption (voice and CAI data packets), DES Encryption for backwards compatibility (voice and CAI data packets), Key Fill Interface to the Radio, Over the Air Rekeying service, Inter KMF Interface, Authentication of radios and infrastructure in Trunking.
34.	What additional Security Interfaces and Services are being worked on in TIA/P25?	Key Fill Interface to the KMF, Authentication Facility and between Key Fill devices. Link Layer Encryption for protection of Control signaling and group/individual IDs on the trunking control channel, trunked and conventional voice channels and trunked and conventional data channels.

	P25 and Other Technologies	
35.	Does the future FirstNet LTE broadband data network make P25 obsolete?	No, many Public Safety and Industry technology experts and organizations including the National Public Safety Telecommunications Council (NPSTC), DHS Office of Emergency Communications, and First-Net themselves are on the record that Project 25 is the standard for government and public safety communication systems today and will remain as the primary technology for secure interoperable voice systems for decades to come. LTE broadband for Public Safety will mature and be built out over the next few years offering many valuable and exciting new interoperable data services. It is expected that the technologies will complement one another and be merged at both the infrastructure and subscriber unit level.
36.	What are the benefits of P25 equipment over TETRA equipment?	Benefits of P25 over TETRA include: Backward compatibility to existing systems including analog, fewer sites needed for large geographic coverage, and well developed direct "unit to unit" operation for radios working outside of the infrastructure coverage. P25 is the established technology of choice for Federal, State, and Local government radio systems. Project 25 devices and systems comply with US narrow band regulations for 12.5 kHz in VHF/UHF/ bands, and 6.25kHz efficiency with Project 25 Phase 2 in 700 MHz
37.	Is P25 interoperable with NEXEDGE, MOTOTRBO, or DMR?	No they are not directly interoperable technologies. A strength of the P25 suite of standards is the breadth of defined interfaces. Most of the other standards mentioned have only published standards for the CAI. There are a variety of manufacturers who offer interoperability products and consoles that provide hard and soft patches between these protocols and P25 at a voice level and some that can route metadata like the Caller ID.
38.	What is the difference between DMR and P25?	P25 provides a number of Public Safety features that DMR does not. P25 has been more closely scrutinized by the US government, the consultant community, and others to document the degree to which the standard meets public safety needs,

		manufacturers are following the standard, and the extent to which products are interoperable.
39.	What is the range comparison between P25 digital and narrowband analog?	Range is dependent on operating band, noise level at the site, receiver design and performance specs which vary by radio and by manufacturer. It is best to consult the manufacturer of the radio of interest for range performance predictions. TIA TSB-88 discusses coverage prediction and measurement techniques. All LMR systems including analog are now required to operate on 12.5 KHz channels in VHF and UHF bands. Testing has shown that narrow banding can have pronounced effects when RF channel impairments and background noise are considered. P25 offers better range for users in the required narrowband world. P25 Phase 1 technology is about +7dB better than 25 KHz Analog and close to +10dB better than the newly required 12.5 kHz analog for the same Delivered Audio Quality (DAQ). Although P25 has improved coverage over analog, and significantly over narrowband analog, concerns with the difference in real world operation cannot be ignored. In general, a digital receiver will provide a good quality signal to a greater range than an analog receiver and then effectively stop receiving once the range limits are reached. Typically in these conditions the corresponding analog audio is still detectable but is virtually incomprehensible due to the poor signal-to-noise ratio and thus it is of little practical use. Technically the analog signal may have greater range, but may have a significantly smaller useful range.
	P25 Tech Tips	
40.	My old conventional analog radios had a squelch burst that let me know the talker had ended transmission.	A "squelch burst" is a phenomenon of analog transmissions and cannot occur in digital transmissions. Many P25 radios have a display that clearly indicates when the call (analog or digital) is in progress and when it has ended. The standard does allow an

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		artificial squelch tail to exist on the digital channel. Some companies have created an artificial squelch tail on their digital channel.
41.	Is it possible to scan patched talk groups in a P25 system?	"Patched talkgroups" is a P25 standard feature called Group Regrouping. Scan is a radio feature that is supported by standard signaling, but is not specifically defined by the standard. So it is possible to scan "regrouped/patched" talkgroups, but operation may vary between vendors.
42.	Can a radio scan when roaming onto a visited RFSS connected via ISSI?	Scan is a radio feature that is supported by standard signaling but is not specifically defined by the P25 standard and so, operation varies between vendors, but a radio can scan when roamed onto a visited RFSS. However, scanning requires that calls of interest are propagated to the RF site where the scanning radio is registered. Scanning local RFSS group calls is not a problem, but a lot of planning between all involved departments/agencies is required to coordinate radio and group IDs when multiple systems are interconnected and to enable routing of Home RFSS group calls to the visited RFSS. This is a significant task and needs to be undertaken as part of the system design. Some enhancements to the ISSI standard could facilitate scanning of Home RFSS group calls, but this is not currently planned.