tait
communications

Don't get locked in…

Demand Genuine P25 open standards
for your critical communications

EXECUTIVE SUMMARY

When the time comes to replace or expand your network, genuine P25 open standards bring real advantages to Public Safety network operators. Genuine open standards are non-proprietary, so they are not under the control of one vendor. An increasing choice of certified vendors brings down prices, improves technical quality and avoids the risk of being locked in to a sole supplier.

This paper describes how P25 open standards guarantees choice, that will lower costs and improve communications, without compromising interoperability regardless of your previous supplier.

WHY P25 IS RIGHT FOR PUBLIC SAFETY COMMUNICATIONS

P25 was designed by Public Safety users in conjunction with radio manufacturers to provide real-world mission critical communications solutions. It provides reliable, clear communications over a wide area and interoperability so that users from different agencies can talk to each other.

P25 guarantees a competitive market, in which manufacturers strive to improve quality and cost-effectiveness.

COMMUNICATIONS NETWORK ESSENTIALS

▸ Reliability
▸ Audio Clarity
▸ Exceptional coverage
▸ The right call services
▸ Privacy and security
▸ Interoperability
▸ Data capability
▸ Instant Communications/Network Access
▸ All aware Communications - Group Calls

RELIABILITY:

Unlike cellular or internet communications, Public Safety users cannot accept dropped calls, overloads or outages.

AUDIO CLARITY

Urgent communications between officers and agencies must be clear. Communications misunderstood due to background noise or distortion place officers in danger.

EXCEPTIONAL COVERAGE

Network coverage engineered to your requirements mean officers can stay in touch, inside buildings and at the far reaches of your jurisdiction.

THE RIGHT CALL SERVICES

Call services must match your operational requirements. For some agencies, all-informed broadcast is more than sufficient. However, fire officers rely on point to point calls inside a fire scene, and many agencies depend on group calls. The demands of multiple groups and multiple agencies need emergency protocols and prioritising.

PRIVACY AND SECURITY

Encryption ensures that only the intended participants can take part in a call. Unwanted listeners are effectively cut out of the call, leaving agencies to manage incidents more effectively and safely. Authentication ensures any authorised parties can use the network.

INTEROPERABILITY

Now more than ever, agencies must cooperate and communicate with each other. For agencies replacing ageing analog equipment, the US government will supply Federal funding for interoperable replacement technology. Tait can also provide analog for updated analog networks even though they are on a digital system.

DATA CAPABILITY

Data has an increasing role as agencies transmit text messages, status updates, AVL/GPS for incident locations and access public safety database information.

WHAT P25 OPEN STANDARDS MEAN FOR NETWORK OPERATORS

Developed with the active participation of radio vendors, this initiative is a dynamic, expanding suite of standards, driven by Public Safety needs which are set to evolve in tune with other rapidly-evolving digital technologies such as computer networks and VoIP.

For network operators, this means:

▸ Getting the best from your available radio spectrum,
▸ Communicating more efficiently within agencies and between agencies,
▸ A competitive market with many different manufacturers and vendors participating,
▸ A technology platform that is easy to use.

All features and functions of P25 equipment fall within one of the following categories:

MANDATORY REQUIREMENTS:

Minimum functional criteria for P25 radios are the Common Air Interface (CAI) that defines the digital radio transmissions, and the Improved Multi-Band Excitation (IMBE) or Advanced Multi-Band Excitation (AMBE) vocoder that converts voice to digital.

STANDARD OPTIONS

Clearly-defined standard options are at manufacturers' discretion to include in their product. For example, data service and encryption are standard options; equipment does not necessarily support them, but if it does, it must follow the standard to ensure interoperability.

MANUFACTURERS' OPTIONS

Manufacturers' proprietary options mean that although many P25 manufacturers make compliant equipment, they are free to incorporate additional features and functions into their products. This will negatively affect interoperability although they may add value at a lower cost. Examples are proprietary encryption and radio network interconnection.

Network interfaces: open standards exist for console connections (CSSI), enabling vendor choice for consoles. Digital voice recorders can also connect via open standards. Open standards exist for inter-network connetions (ISSI).

INTEROPERABILITY FOR MUTUAL AID AND SPECIAL TASK FORCES

Radio systems can operate with differing levels of interoperability, depending on priority and need. Task forces need the highest level, while routine public safety operations require less. US Federal organization SAFECOM (www.safecomprogram.gov) defines six levels of interoperability, from shared systems to simply swapping radios. See the SAFECOM site for more details.

In general, Public Safety agencies need to interoperate as follows:

TASK FORCE INTEROPERABILITY

Multi-agency task forces lead the extended recovery operations for major disasters, provide security for major events and conduct joint operations in criminal investigations.

MUTUAL AID INTEROPERABILITY

In a collective and immediate response to a catastrophic accident or disaster – wildfires, earthquakes, hurricanes, aircraft crashes - tactical communications between public safety groups will be required.

DAY TO DAY INTEROPERABILITY

Neighboring law enforcement agencies must work together during routine public safety operations, such as vehicle pursuits.

NETWORK UPGRADING TO P25 DIGITAL

It is neither financially nor logistically possible to upgrade an entire network at once. This means as new radios are issued, they must continue to communicate with legacy analog units until all the new radios are installed.

P25 INTEROPERABILITY COMPLIANCE

Ideally, equipment designed and produced to a standard by one vendor should interoperate seamlessly with equipment from another vendor. However, there is often difference in interpretation of a standard, and vendors may also add proprietary features not covered by the standard itself.

When choosing a vendor, look for standardized interoperability test procedures, and carefully scrutinize certification documents to avoid incompatibilities.

P25 SUBSCRIBER UNITS

P25 digital radio equipment is backwards compatible with standard analog FM radios, so that network operators can gradually phase out radios and infrastructure equipment.

P25 COMMON AIR INTERFACE (CAI)

The CAI was carefully engineered to ensure agencies would experience superior digital audio clarity without needing to fund significantly more radio sites in order to match their analog network coverage.

SYSTEM LEVEL INTEROPERABILITY

While previously agencies were forced to rely on vendors to connect radio networks, the Inter RF SubSystem Interface (ISSI) connects P25 radio networks, regardless of vendor or frequency band.

P25 COMPLIANCE ASSESSMENT PROGRAM (CAP)

This Government-sponsored program ensures equipment complies with P25 standards and interoperates between manufacturers. Competing vendors test each other's equipment to ensure the program's integrity.

P25 CAP compliance means that equipment:

▸ has been tested at a recognized laboratory

▸ has been determined to be compliant with all current CAP requirements

▸ has a Suppliers' Declaration of Compliance,

▸ has a Summary Test Report reviewed by the CAP Laboratory Program Manager.

For details of compliant equipment, visit the Responder Knowledge Base at www.rkb.us.

P25 RADIO FREQUENCIES

P25 can be used on VHF, UHF and 800MHz frequencies, so most operators can upgrade from their existing analog networks and increase the number of available channels without purchasing a new block of spectrum. How? Narrowband analog is also 12.5 MHz

P25 PHASE 1

With 12.5 kHz channel bandwith, Phase 1 is twice as efficient as traditional analog wideband channels. It is interoperable with legacy analog systems until the old equipment can be replaced.

P25 PHASE 2

Providing an effective 6.25 kHz channel spacing, Phase 2 fits two voice or data streams into a single 12.5 kHz channel. Phase 2 equipment is backwards-compatible and interoperable with P25 Phase 1 equipment.

EVALUATING YOUR CURRENT COMMUNICATIONS NETWORK

There are many reasons why your agency should assess your current communications for upgrade or replacement:

▸ The communications equipment may have reached the end of its economic life or be obsolete.
▸ The number of officers using the network has increased, causing congestion and overload.
▸ The jurisdiction of your agency may have been enlarged through boundary changes or amalgamation.
▸ An independent review of your network recommends a more sophisticated communication solution.
▸ Your agency requires encryption, GPS/AVL or data applications that are not available on your current network.
▸ To reduce ongoing communications expenditure, the agency plans to move from a proprietary solution to an open standard solution to provide supplier competition.
▸ Interoperation with other agencies – country sheriff, prisons, fire, hospitals, city police, fire, neighboring counties – cannot be achieved with your current equipment.

Ultimately, you must decide whether to expand your current network, enhance with complementary technology such as cellular, and replace with a more sophisticated technology or contract/lease communications services from an external provider.

WHY YOU SHOULD CONSIDER UPGRADING TO P25

Public Safety managers are comfortable with controlling availability, reliability and security that network ownership brings, which narrows the upgrade decision down to which technology you will upgrade to. P25 is the open standard designed by, and for Public Safety. It offers:

▸ Spectral efficiency and coverage capacity,'
▸ Standards-based support for dispatch operations and equipment,
▸ Ease of migration from current analog network,
▸ Flexible system design,
▸ Subscriber usability,
▸ Ease of management,
▸ Increased privacy protection with standards-based encryption,
▸ Network access control
▸ Vendor competitiveness for the lifetime of the network,
▸ Guaranteed future-proofing to keep pace with technical developments
▸ Inter-network Connection

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