Hytera

Push-to-Talk Over Cellular (PoC)

WHITE PAPER

Understanding the PoC Ecosystem: Push-to-Talk over Cellular, Push-to-Talk over Wi-Fi, and unified PoC, Wi-Fi and LMR platforms

Table of Contents:

PUSH-TO-TALK OVER CELLULAR (POC)

What is PoC?

Push-to-Talk over Cellular (PoC) provides two-way radio services over 3G, 4G, and Long Term Evolution (LTE) technology, creating a nationwide radio network that utilizes the cellular infrastructure of Mobile Network Operators. This enables radio networks with very wide coverage areas. Radio users are untethered by the range of repeaters and base stations used in traditional radio networks.

> PoC utilizes LTE cellular infrastructure to create a wide-area radio network that provides national coverage for voice and video communications

The concept of Push-to-Talk over Cellular was introduced by Nextel in 1987 as an alternative to two-way radios. Nextel revolutionized business communication when it started to pass small voice packets across their iDEN network. Prior to PoC, business communication was dominated by two-way radios on peer-to-peer and local radio networks. Nextel was acquired by Sprint, and in 2013 Sprint decommissioned the Nextel iDEN network because it could not support modern LTE data and video bandwidth requirements.
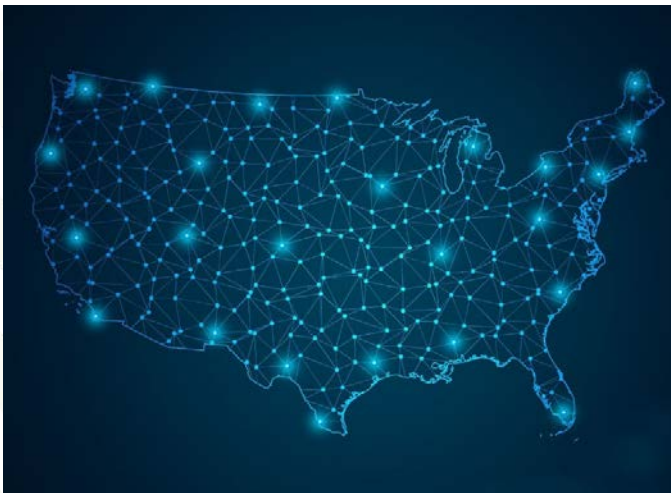

Today, PoC provides the best of both narrowband digital radios and broadband LTE networks. PoC radios support the advanced features of Digital Mobile Radios (DMR), including messaging, instant group calling, GPS location tracking, and emergency notifications. Combining this functionality with Wi-Fi and LTE cellular networks provides the bandwidth required for modern data and video applications, along with the national coverage area of 4G/LTE.

How PoC Works

PoC devices connect to the cellular infrastructure of Mobile Network Operators like AT&T, T-Mobile, and Verizon, using a SIM card similar to those installed in cell phones. The result is access to an existing and reliable network that requires no maintenance or operational expenses. An app on the PoC radio (typically an Android operating system) provides simple and convenient access to PoC services.

PoC network services are hosted in the cloud. The cloud services are located on privately hosted servers operated by the PoC platform owner. Gateway routers provide connectivity between the LTE network and the cloud hosted PoC server. Dispatch Applications and the Management Application (used to configure customer accounts) are connected to the PoC cloud server through the internet.
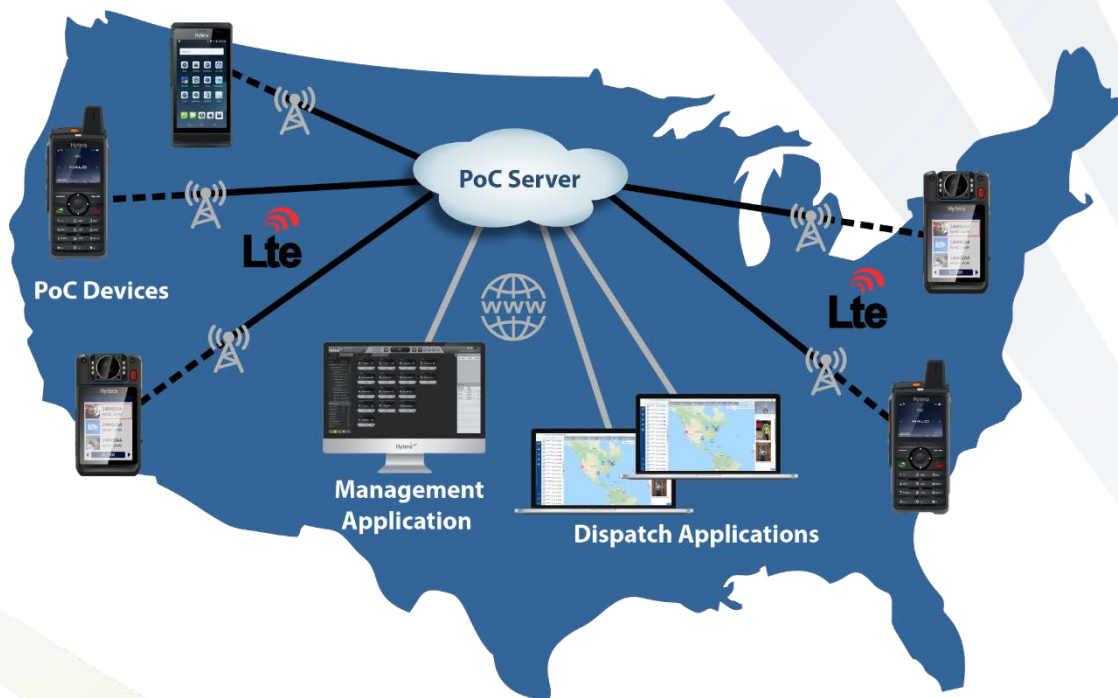
PoC Group Calling

PoC provides the same group calling capabilities as traditional two-way radio systems to enable instant group calls to multiple users with the press of a PTT button on a radio or from a dispatching application.

Call groups are set up based on all call and emergency calls, types of employees (supervisors, administrators, etc.), remote employees and mobile service fleets, employee locations, type of projects, etc. Radio users can belong to multiple groups as shown in the overlapping areas.

PoC Market Growth

Growth in PoC services is being driven not just by the LTE technology, but also by the increase in the global mobile workforces, and the global adoption of the Internet of Things (IoT). At its peak, Nextel had over twenty million subscribers, proving the demand for wide-area voice and data workforce communications.

KBV Research, January 2020 - The Global PoC market size is expected to reach $43.8 billion by 2025, with the market rising at a Compound Annual Growth Rate (CAGR) of 10.1%.

Research and Markets, March 2020 - The global PoC market was valued $21B in 2017 and is projected to reach $55B by 2027 and grow at a CAGR of 11.2% during 2020-2027.

Fortune Business Insights, June 2020 - The global PoC market value was $12B in 2019 and is projected to reach $25.5B by 2027 with a CAGR of 10%. North America is expected to lead the market share during the forecast period. The projected growth declined due to the COVID-19 pandemic.

Who Uses PoC?

Businesses which use PoC services are looking for wide-area workforce communications with a low start-up cost. PoC is particularly useful for businesses with vehicle fleets, as asset tracking via GPS is an integral component of the PoC dispatch solution. PoC also provides a cost-effective solution for organizations where traditional Land Mobile Radio (LMR) solutions do not support broadband applications, and the availability of licensed radio frequency spectrum is limited or unavailable.

- Contractors and Building Materials
- Security Guards
- Property Management
- Retail
- Hospitals and Healthcare
- Hospitality
- Bus and Transportation
- Waste Management
- Entertainment, Theme Parks, and Zoos
- Event Production Companies
- Food Distribution and Delivery Services

The PoC OPEX vs CAPEX Model

Traditional wide-area private radio networks require significant up-front Capital Expenditures (CAPEX), that include FCC licensing, and the cost of radio equipment hardware such as base stations, repeaters, routers, and antennas. PoC can be deployed from an Operational Expenditures (OPEX) budget as a low-cost, subscription-based service.

PoC Features and Benefits

Nationwide Coverage
PoC leverages 3G/4G/LTE and Wi-Fi networks to provide secure, instant, and nationwide communications for today's mobile workforce.

No Infrastructure Required
There is no need to purchase, operate and maintain any infrastructure, as this is managed by the Mobile Network Operators. This reduces capital equipment costs, day-to-day operating and maintenance costs, and eliminates the need for frequency licenses required by the FCC for private LMR systems.

Rapid Deployments
Since the communications network infrastructure already exists, PoC systems can be deployed very quickly. PoC radios can work out-of-the-box with SIM cards pre-installed, and system configuration is done through an easy-to-use web-based dispatch application.

Instant Push-to-Talk Voice and Video Group Calling
PoC technology enables subscribers to make one-to-one (individual) calls or one-to-many (group) calls to different groups of people at the same time over Wi-Fi or a mobile operator's network. One press of a button on a rugged handheld device and you are talking to your group or an individual. PoC devices with cameras and video capabilities enable instant picture messaging and video conferencing with individuals or groups using dispatcher applications.
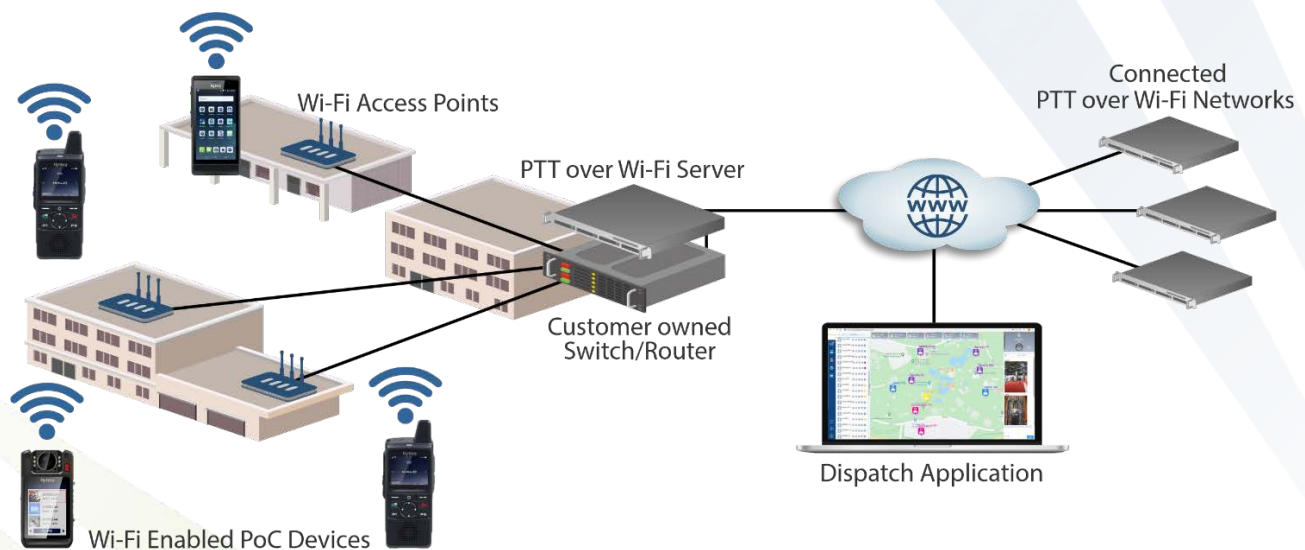
GPS Location Tracking
PoC devices with integrated GPS enable location tracking via a dispatcher application. This is an essential tool for managing, scheduling, and tracking remote teams in real time. PoC dispatch applications that support Geo Fencing enable alarm triggers when, for example, employees enter hazardous areas, or when remote service employees stray from defined territories. Dispatchers are typically web-based applications allowing for easy deployments and minimal start-up costs.

PUSH-TO-TALK OVER WI-FI

PoC devices also support Wi-Fi connectivity. This enables instant group voice and video calling in a large building, facility, entertainment complex, or campus with Wi-Fi network connectivity, or within Wi-Fi network hotspots.

How PTT over Wi-Fi Works

Push-to-talk over Wi-Fi leverages the existing Wi-Fi network and access points throughout a facility, so there is no need to install traditional radio network infrastructure. The first step in a PTT over Wi-Fi deployment is to conduct a site-wide bandwidth audit to ensure there is enough coverage for the whole facility. Then a Push-to-talk over Wi-Fi a server is installed to provide system connectivity between the Wi-Fi network, the PoC devices, and the dispatch application. The last step is to configure PoC devices with call groups and device functions and distribute them to employees.

Wi-Fi Access Points

Connected
PTT over Wi-Fi Networks

PTT over Wi-Fi Server

Customer owned
Switch/Router

Dispatch Application

Wi-Fi Enabled PoC Devices

A web-based dispatch application is used to initiate group voice and video calls from a single location. Dispatch applications can also utilize the GPS capabilities built into PoC devices to track employees throughout a large outdoor facility like a convention center or entertainment complex (zoo, theme park, etc.).

Push-to-talk over Wi-Fi is not limited to a single location. Several sites can be connected over an IP Network or VPN and managed from one or more dispatch applications. For example, a hotel and resort may have several locations with Push-to-talk over Wi-Fi, and they want centralized call management and dispatching.

Push-to-talk over Wi-Fi can also be seamlessly integrated with a nationwide PoC network to enable communication with remote and mobile workers. By adding a SIM card, PoC devices can automatically switch to an LTE network when a caller moves outside Wi-Fi network range.

Push-to-Talk over Wi-Fi Features and Benefits

No Infrastructure Required

PTT over Wi-Fi uses existing Wi-Fi networks, so there is no need to purchase, operate and maintain any radio infrastructure. This reduces costs and enables rapid deployments.

Flexible Single-Site, Multi-Site and Nationwide Coverage

PTT over Wi-Fi can be deployed as a single-site radio network, or multiple sites can be connected over an IP Network or VPN. PoC devices also function on nationwide PoC networks with the installation of a SIM card.

No Radio Frequency Licenses Required

Push-to-Talk over Wi-Fi eliminates the need for expensive radio frequency licenses, and in many high-density urban areas there may be no frequency spectrum available.

Push-to-Talk Voice and Video Group Calling

PTT over Wi-Fi provides the same instant group calling capabilities as PoC systems, including group video conferencing with devices that support video.

GPS Location Tracking

PoC devices with integrated GPS enable location tracking via a dispatcher. This is useful in large campuses or entertainment complexes for managing, scheduling, and tracking employee locations.

Who Uses PTT over Wi-Fi?

Wi-Fi is nearly ubiquitous in all buildings and facilities and enables companies to leverage their existing investment in Wi-Fi infrastructure.

- Hospitals
- Schools and Universities
- Convention Centers
- Office Buildings
- Factories and Warehouses
- Hotels and Resorts
- Theme Parks, Zoos, and Aquariums
- Museums and Art Galleries
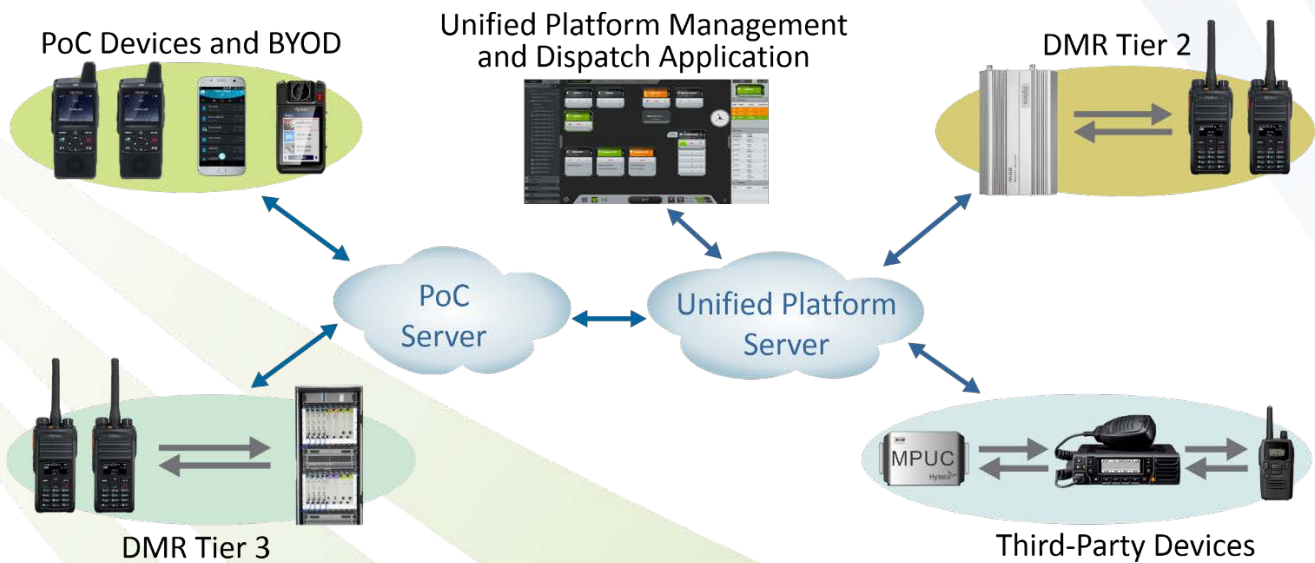
UNIFIED COMMUINICATIONS PLATFORMS

Unified communications platforms integrate different radio systems into a single wide-area radio network with instant group calling and location-based dispatching.

Expand the capabilities and range of existing radio networks by integrating Push-to-Talk over Cellular and Push-to-Talk over Wi-Fi networks into a single voice and video radio communications ecosystem.

How Unified Communications Platforms Work

Virtually any radio communications network can be integrated into a unified communications platform. These include PoC and Wi-Fi networks, DMR Tier II and Tier III, TETRA, P25, NexEdge, dPMR, and even legacy analog radio systems.
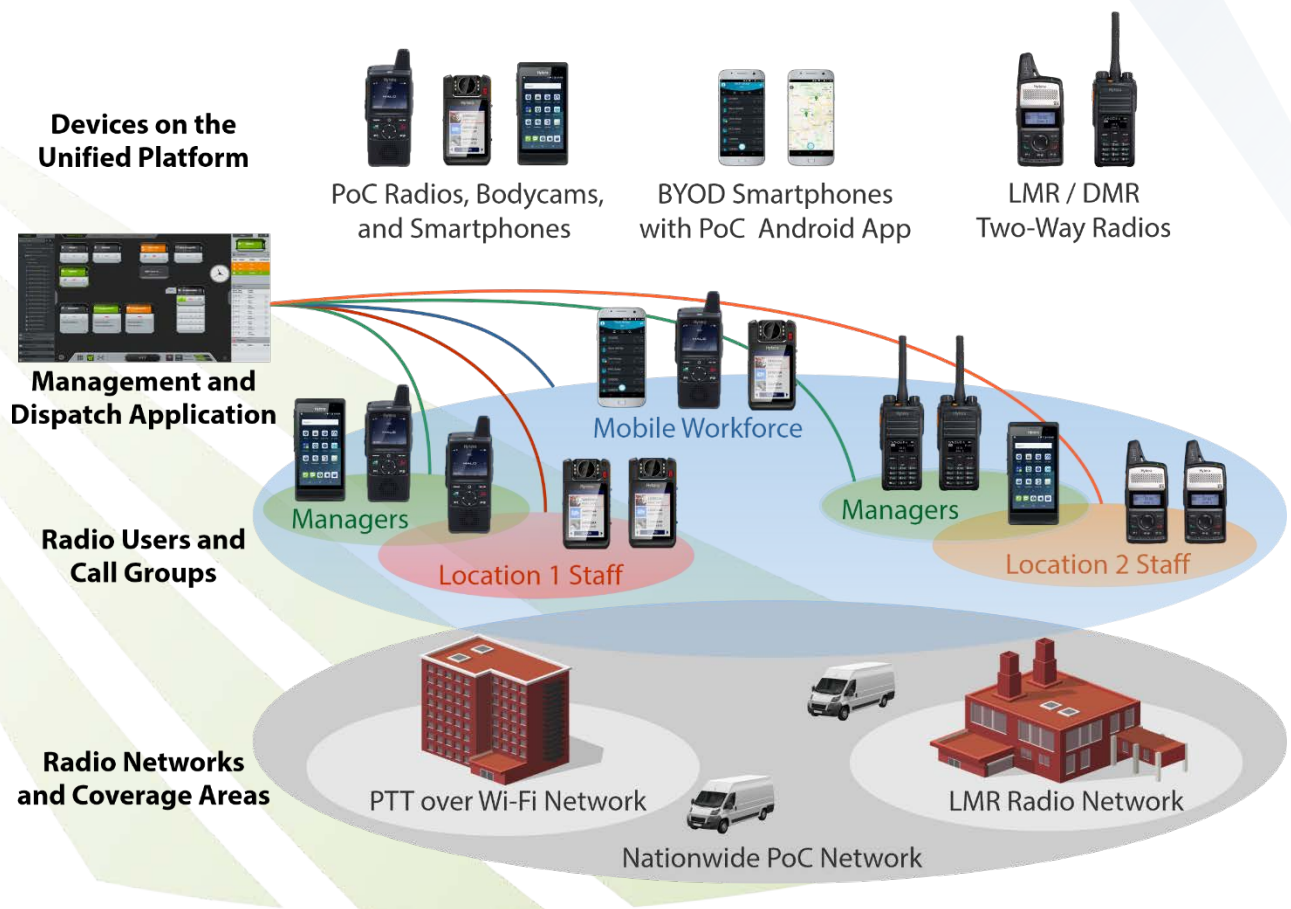
Unified platform management and dispatch applications enable communication with groups of users across several types of radio networks. Voice and video calling groups can be created that include several types of radios and networks, and users can belong to multiple call groups.

These unified platform applications provide public-safety grade dispatching and fleet management, voice and video group calling, call recording, AVL, and camera monitoring. The powerful dispatching client allows the managers and dispatchers to quickly command all users in different networks with Simul-Select and Crosspatch capabilities.

In the example shown below, a company has two large facilities at different locations. One has a Push-to-Talk over Wi-Fi network, the other a traditional Digital Mobile Radio (DMR) trunked radio network. The company has added a PoC radio network for a mobile workforce. By using a unified platform management and dispatch application, and installing a unified platform server, the existing PTT over Wi-Fi radio network, the LMR radio network, and the PoC network are integrated into a single, unified wide-area radio network that covers a wide area in and around both facilities. The DMR radios, the PoC devices, and the BYOD devices are all on the same communications system with call groups that include all the different types of radio technologies.

Devices on the Unified Platform

PoC Radios, Bodycams, and Smartphones

BYOD Smartphones with PoC Android App

LMR / DMR Two-Way Radios

Management and Dispatch Application

Mobile Workforce

Radio Users and Call Groups

Managers

Location 1 Staff

Managers

Location 2 Staff

Radio Networks and Coverage Areas

PTT over Wi-Fi Network

LMR Radio Network

Nationwide PoC Network

The Benefits of Unified Communications Platforms

Centralized Communications and Dispatching

Centralize operations by integrating different radio networks into a unified communications management platform that improves efficiencies and communication within large organizations. Use a one centralized dispatch application for location tracking and group communications across a single system.

Reduce Costs

Eliminate the need for system-wide upgrades and maintain investments in existing radio equipment

by integrating current radio systems with PoC nationwide and Push-to-Talk over Wi-Fi networks.

Group Voice and Video Calling

Supports instant, system-wide group voice and video calls, group patching, broadcast calls, priority calls, and call monitoring. Video conference and share videos between dispatch and remote users.

POC DEVICES AND SOFTWARE APPLICATIONS

Hytera HALO is a suite of PoC systems that provide network access, PoC devices, and dispatch applications. Hytera HALO Nationwide is a PoC solution with wide area connectivity over cellular 3G/4G/LTE networks, and Hytera HALO OnSite is single or multi-site Push-to-Talk over Wi-Fi system. The Hytera HALO Nationwide and OnSite systems are complementary and can be deployed with both local coverage and wide-area coverage. Hytea HALO Connect is a unified LMR and PoC platform. The Hytera HALO Android app is available for Bring Your Own Device (BYOD) smartphones.

Push-to-Talk over Cellular
Group Communications Solution

Push-to-Talk over Wi-Fi
Group Communications Solution

Push-to-Talk over Cellular and LMR
Unified Communications Solution

Hytera PoC Radios

The Hytera PNC370 and PNC380S PoC radios are purpose built for business communications. These compact, rugged, and easy-to-operate handheld devices enable group voice and video communications over nationwide LTE cellular networks.

- Digital noise suppression and high-volume speakers for excellent voice quality in loud environments

- Built-in Wi-Fi that automatically switches over to the LTE network when out of Wi-Fi range

- Built-in Bluetooth supports wireless connection with audio accessories for hands-free operation

- GPS enables tracking and positioning for the dispatching application

- Ruggedized to IP55 (PNC370), IP67 (PNC380S) and MIL-STD-810 G standards

- Supports individual or group texting

- Powerful battery provides up to twenty-four hours of operation

- In addition to these features, the PNC380S features a built-in camera, full keypad, and is AT&T network approved

A car kit is available for the PNC380S PoC radio and provides safe and DOT approved use in vehicles. The key advantage is that it enables the PoC device to be used inside and outside the vehicle. The car kit is installed on a vehicle dashboard and enables easy removal of the handheld device for job-site communications. The car kit includes a locking bracket to ensure drivers who work inside the vehicle use the radio as a dash-mount mobile radio and not a handheld device. The car kit provides charging power, has an on/off button, and ports for external speakers, microphones, and push-to-talk buttons.

Hytera PoC Smartphones

The Hytera PNC550 is a Push-to-Talk over Cellular (PoC) smartphone designed for nationwide business communications. The PNC550 combines the advantages of a smartphone with the ruggedness, enhanced audio quality, and instant Push-to-Talk group communications of a professional PoC device.

- National wide-area communication with mobile 3G/4G/LTE connectivity

- Built-in Wi-Fi supports in-building communications with seamless switching to LTE networks when outside Wi-Fi range

- Push-to-Talk button initiates instant voice or video calls to groups or individuals

- Rugged design with Gorilla Glass display, MIL-STD-810-G compliance for shock and vibration, and IP68 rated for complete water and dust resistance

- Features a 13MP rear camera with flash and an 8MP front camera for video calling with the Hytera HALO Dispatch application and other PoC devices

- Digital, dual mic noise suppression and high-volume speaker for excellent voice quality in loud environments

- Dual SIM cards provide flexibility for two network access plans, one for PoC and the other for a cellular plan or data-only plan

- GPS enables real-time tracking and positioning for the Hytera HALO Dispatch application

- Supports Android apps and can run the Hytera HALO Dispatch web-based application. Open API and SDK allow third party developing customized applications

- Powerful 4,000mAh Lithium-Ion Polymer battery delivers up to 24 hours of operation

Hytera PoC Body Worn Cameras

The Hytera VM780 Body Worn Camera integrates a body camera with Push-to-Talk over Cellular (PoC) voice communications to capture, store, and share video, audio, and image evidence in the field. The VM780 features video transfer, evidence collection, and dispatching software applications.

- All-in-one design reduces equipment costs and simplifies communications

- Full duplex voice calling and video conferencing

- 2.8-inch touch display

- HD 1080P video recording with AES256 advanced encryption

- Stream video over 4G/LTE or Wi-Fi networks for nationwide monitoring of events

- GPS built-in and Hytera HALO Dispatch application compatibility

- Supports individual and group calls between dispatch, VM780, and other POC devices

- IP68 and MIL-STD-810G rated

- Powerful battery life supporting up to nine hours of continuous recording

- Features an optional six-unit charger that enables simultaneous charging and automatic video transfer from up to 18 bodycams

Hytera HALO Dispatch

Hytera HALO includes a powerful web-based dispatch and fleet management application that tracks driver locations and travel routes with time stamps. The dispatch application works with the GPS built into Hytera PoC devices and supports geofencing capabilities.

Hytera HALO Dispatch supports instant group calling as well as individual calling. Dynamic call groups can be quickly created with a simple list selection or geographically by selecting an area on the dispatch map. The dispatcher may stun (turn off) and reactivate a radio, and receive emergency alarms.
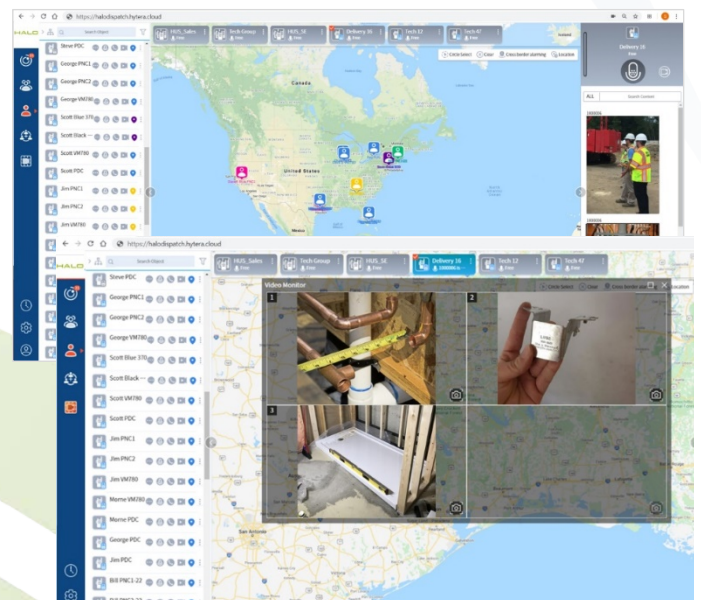
PoC Devices vs. Smartphones

Employees can use personal smartphones, company issued smartphones, or PoC radios, PoC video bodycams, or PoC smartphones for internal company business communication. BYOD smartphones can be used as PoC devices with an Android app installed on the device.

Companies may prefer to have some or all employees using smartphones for business communications, but there are several advantages to providing employees with dedicated PoC devices.

- PoC devices and service plans are less expensive than smartphones and cellular plans
- Ensures employees use the devices exclusively for business-related communications and reduces the distractions of personal smartphones
- Instant Push-to-Talk group and individual calls without launching apps, looking up contacts, or waiting for the phone to ring
- Rugged devices that withstand high impact (dropping), water submersion, and dust
- High power batteries that guarantee calling availability for the entire work shift
- High volume and noise cancelling technology for use in noisy environments
- One touch emergency alarms for worker safety
- Car mounting kits are available for DOT approved use inside vehicles

SUMMARY

Push-to-Talk over Cellular is a disruptive technology that is creating a new market and value network that will create shifts in the market for established companies, products and alliances. As cellular LTE and Wi-Fi networks continue to mature, providing better coverage with more available bandwidth, PoC will continue to grow and disrupt the established Land Mobile Radio (LMR) market.

- PoC systems provide key advantages, including wide area coverage, rapid deployments with no radio infrastructure or FCC licensing expenses, dispatching and GPS location tracking.

- PoC devices are ruggedized for industrial applications and enable instant individual and group push-to-talk communications, video conferencing, data services, and Wi-Fi connectivity.

- Push-to-Talk over Wi-Fi leverages the ubiquity of Wi-Fi networks for quick and cost-effective deployments, and do not require frequency spectrum.

- Unified PoC networks enable centralized communications with nationwide coverage that integrates virtually all types of radio networks into a single business communications ecosystem.

PoC cellular technology, and ability to integrate PoC with Wi-Fi and LMR radio networks provides the flexibility, low cost, and wide-area coverage required for modern workforce communications.
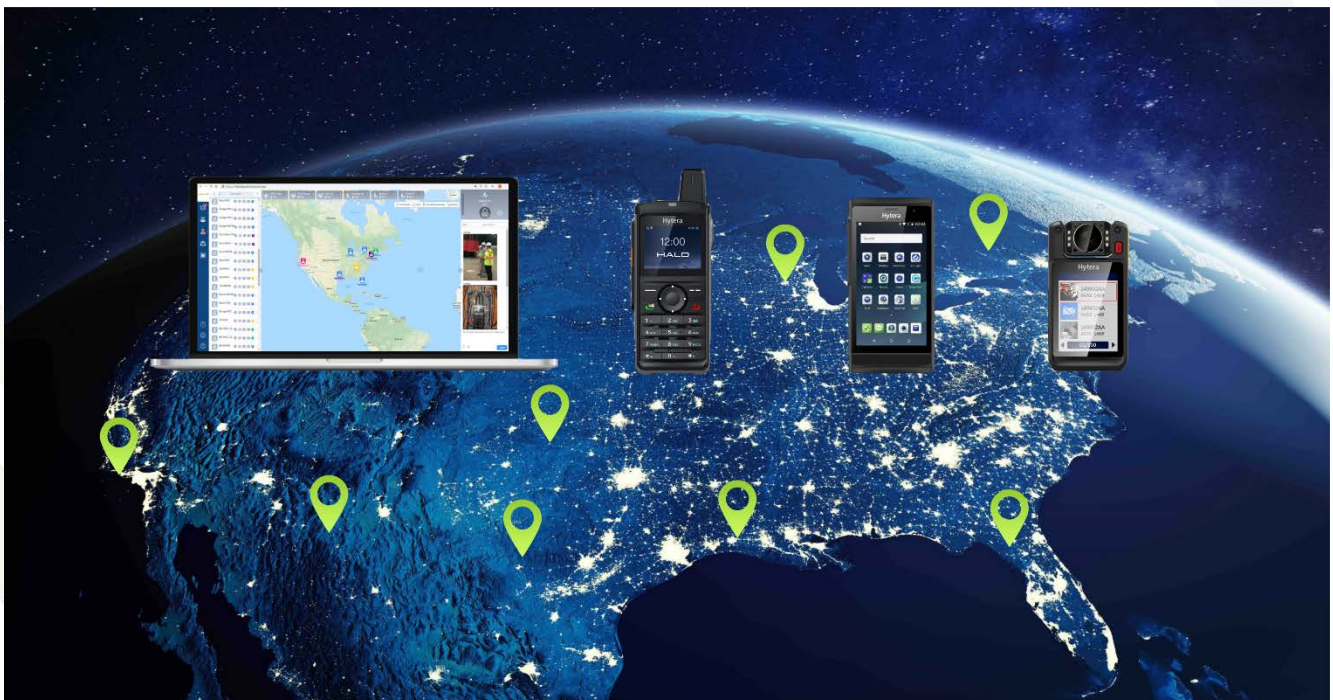
About Hytera

Hytera is a global leader in research and development, state-of-the-art manufacturing, and bringing next-generation radio technology to the market. Hytera has ten international R&D Innovation Centers and more than 90 regional organizations around the world. 40% of Hytera employees are engaged in engineering, research, and product design.

Since its founding in 1993, Hytera has established itself as a innovating provider of wireless communications solutions for the government, transportation, commercial, and industrial sectors. Hytera America offers a full suite of two-way radio products and communication solutions to meet any demand and budget.

- DMR Two-Way Radios
- Push-to-Talk over Cellular Devices and Systems
- Analog Two-Way Radios
- Biometric Access Control and Temperature Screening Devices

Hytera is the fastest growing radio communications company in the world.

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