

DMR and PoC Radio Systems A Practical Comparison Guide

WHITE PAPER



Understanding the Differences between DMR Two-Way Radio Systems and Push-to-Talk over Cellular

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Introduction

Effective communication is crucial for efficient operations and safety. Whether deploying a new system or enhancing an existing one, understanding the latest innovations in radio communications can significantly impact operational efficiency and Return on Investment.

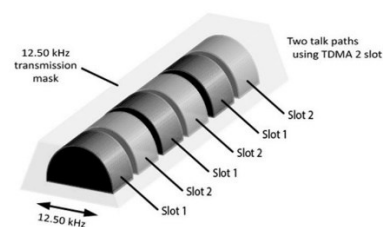
This white paper reviews and compares industry-standard Digital Mobile Radio (DMR) systems that use licensed UHF and VHF frequencies and private radio infrastructure, and Push-to-Talk over Cellular (PoC) systems that use nationwide LTE mobile operator networks. In addition, it will cover hybrid interconnectivity solutions and dispatching applications.

Part 1: DMR Radio Systems

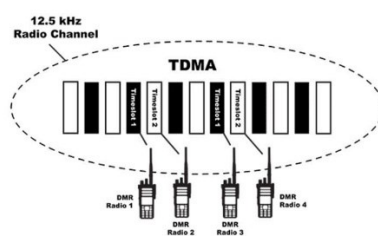
Developed by the European Telecommunications Standards Institute (ETSI) and promoted by the DMR Association, DMR is widely adopted and provided by most manufacturers. DMR systems typically support the 150 to 174 VHF and 400-512 UHF frequency ranges. DMR systems are also available in the low band of 66-88MHz (rarely used) and high band range of 806-941MHz.

The key technology behind modern digital two-way radios is Time Division Multiple Access (TDMA) with 12.5 MHz channel spacing. This technology improves performance and reliability by doubling the calling capacity of analog systems, allowing multiple users to share the same digitized radio frequency by dividing it into time slots.

TDMA Time Slots within 12.5 kHz



TDMA Time Slots Radio Allocation



DMR has high transmit power and fully leverages TDMA technology for higher call capacity, data rate, and range. DMR interoperability is excellent among different manufacturers and is the most widely available and cost-effective professional radio system.

Other benefits of DMR and TDMA technology include improved audio quality, longer battery life, and farther range.

- DMR reduces noise and preserves voice quality, especially at the farthest edges of the transmission range.
- Digital voice coders specified in the DMR standard enable receiving radios to detect and correct transmission errors, resulting in clearer communication.
- TDMA transmits information in short bursts, conserving battery power and improving battery life by 40%.
- TDMA 12.5 MHz channel spacing allows for better frequency reuse, increasing the coverage area.

DMR Radios

[DMR radios](#) are available as handheld and mobile radios that are supported on various repeater and trunking systems. Handheld radios are lightweight and durable, with accessories like microphones and earpieces. Mobile radios are used in vehicles and have higher transmission power for wide-area coverage.

DMR radios include all the benefits of the [DMR standard](#) and can be ruggedized to MIL-STD 801G for impact durability and IP68 rated waterproof and dustproof. Intrinsically Safe models are approved for use around flammable gases, vapors, or dust in e-waste and recycling facilities.

The newest technology in DMR radios includes [AI-based digital noise cancellation](#) and lithium polymer batteries. AI-based noise cancellation extracts the human voice from background noise in real-time, providing clear communication in loud environments. Lithium polymer batteries are lightweight and provide up to 24 hours of operational use.

DMR radios are designed for worker safety with features like a one-touch emergency all-call button, priority interrupt, Lone Worker, and Man Down. Additional features include GPS for dispatch location tracking, Bluetooth for wireless accessories, and advanced AES encryption for secure communications.



DMR Handheld and Mobile Radios

Migrating from Analog to Digital

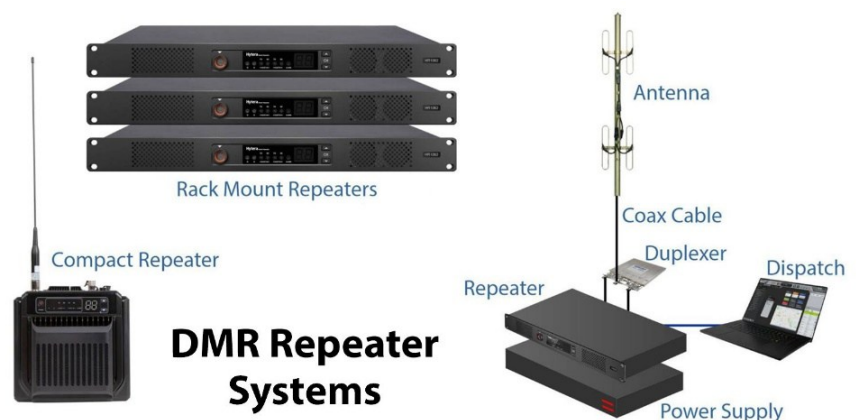
[Transitioning from analog to digital](#) radio systems improves performance and reliability. DMR technology offers clear audio even in noisy environments. DMR radios with TDMA technology also provide longer battery life, and farther transmission range. DMR also eliminates interference from machinery and other nearby radios.

DMR radios support both analog and digital modes, allowing for gradual migration without the need for a complete system overhaul. Old analog radios can be replaced overtime with digital radios, and when all the analog radios have been replaced, a DMR Tier II repeater can be installed for extended coverage and managing the channel traffic.

This flexibility is particularly beneficial for companies that want to upgrade their communication systems gradually without significant upfront costs.

DMR Repeater Systems

[A DMR Tier II repeater system](#) is a professional two-way radio system that uses repeaters for voice and data communications. Tier II uses DMR standard compliant radios and requires FCC licenses. A DMR Tier II Repeater Site consists of a repeater, antenna systems, power supplies, backup batteries, and monitoring systems. The repeater is the heart of a professional DMR radio system. Repeaters receive low-



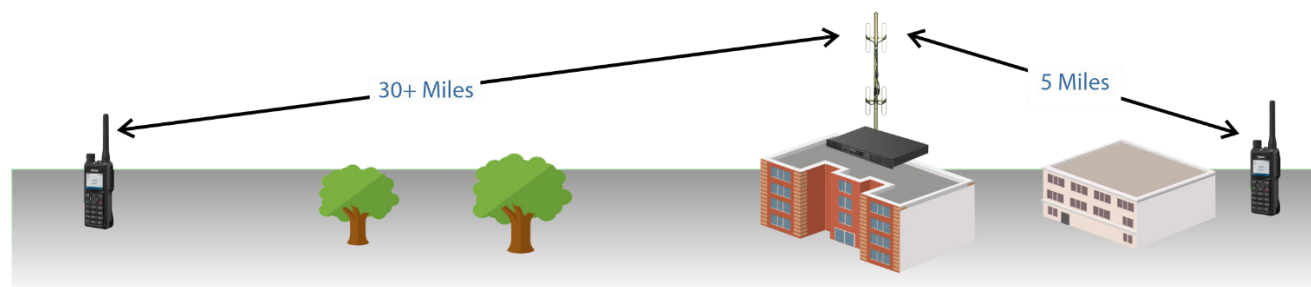
DMR Repeater Systems

level signals from handheld and mobile DMR radios and retransmit the information at a higher power level over a greater area.

Repeater System Range

What is the range of a repeater system? Unfortunately, the answer is “it depends”.

The range of a repeater system can be anywhere between 25 and 50 miles. That includes the distance of one radio to the repeater, and the distance from the repeater to the other radio. This range can be extended with multiple repeaters and antennas.



There are several variables that affect the range of a repeater system:

Obstacles – buildings, hills, walls and trees are the primary determinant of the range of radio systems. UHF and VHF wavelengths go farthest with a line of site, like in flat open country or on the ocean. Dense buildings can limit the range to a few hundred feet.

Antenna – the higher the antenna, the fewer obstacles for the radio signal. This is why antennas are installed on towers, the tops of buildings, and mountains.

The Radios – The transmit power of the radio, Rx sensitivity, antenna gain, and attenuation will also impact the transmission range.

The bottom line is that professional DMR system dealers are experts in designing and installing systems that will cover the required areas. They will conduct a site survey and design a system that provides the necessary coverage.

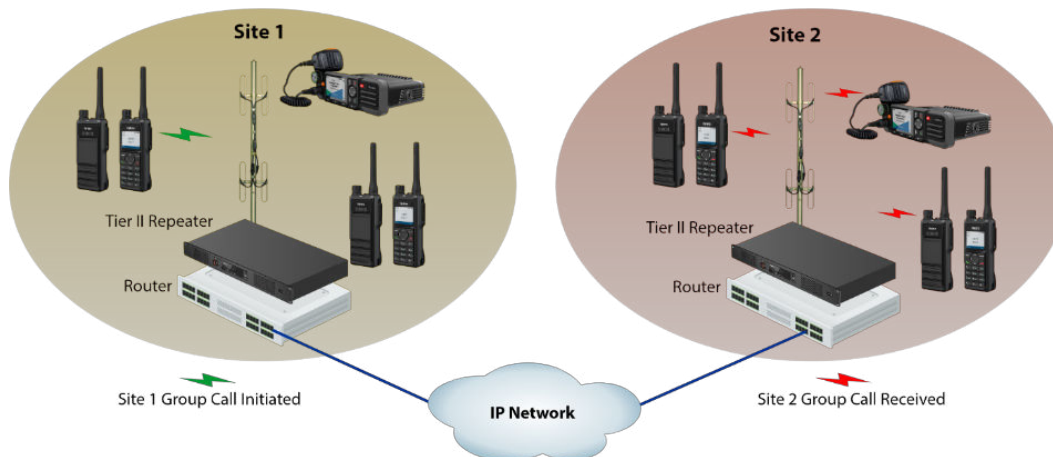
IP Connect

DMR Tier II repeater sites can be [connected over IP networks](#) to create a wide-area network. This setup allows users in different locations to communicate seamlessly.

IP Connect is a digital interconnect that uses Internet Protocol (IP) to link multiple DMR Tier II repeater sites together, creating a wide-area network. With IP Connect, users in different locations can talk over wide areas. IP Connect is typically deployed by organizations that have several remote locations with radio repeater systems and they need communications between these sites. For example, a K12 school district needs to communicate between campuses, or a company may have a manufacturing facility, a warehouse logistics center, and administrative offices that need to communicate.

The IP link can be achieved using third-party IP networks, including wide-area networks like the internet, LAN/WAN, VPNs, or microwave links. Standard network routers are used to provide IP network connectivity. Repeaters are typically connected to the routers via Ethernet ports on the repeaters. The DMR protocol is transported by TCP/IP protocol at the Application layer, so IP Connect only changes the DMR transmission media without affecting the services of DMR radios and repeaters. Because the IP network carries the information that conforms to the DMR Standard, it carries all the DMR features and calling options.

The repeater sites support all the same DMR Tier II functionality as described in the previous section.



In this example application diagram, an organization has two different sites and requires radio communications to all users at both sites. The repeaters are connected to routers that provide connectivity to the IP network that links both sites. If someone needs to speak with a group of workers at another site, IP Connect can make this happen. Since call groups are assigned to channels, it is as easy as changing channels on a radio.

Extended Pseudo Trunking (XPT)

Developed exclusively by Hytera, the [Extended Pseudo Trunking \(XPT\) system](#) is based on the DMR Tier II Conventional Standard and adds capabilities normally found in higher cost Tier III trunking systems. XPT is best suited for organizations that require high-capacity and high-reliability group communications.

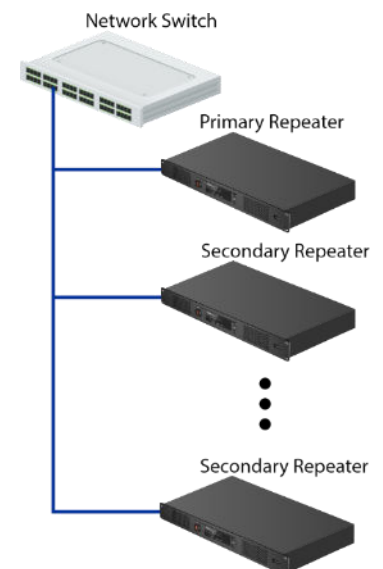
XPT makes DMR Tier II repeater systems more efficient to provide more channel capacity and adds valuable new features without the purchase of expensive radio infrastructure hardware. Migrating from conventional DMR Tier II or IP Connect to XPT trunking is easy, especially if you are currently using Hytera DMR repeaters. XPT is as simple as installing repeaters for the additional channel capacity, adding the license to the repeaters, and adding a network switch for them to communicate.

A key advantage of an XPT Trunking system is that it enables greater efficiency and dynamic channel allocation with less hardware than Tier III trunking systems, and does so without the use of an FCC FB8 Control Channel Frequency further maximizing site capacity.

How XPT Works

The XPT Trunking System enables the combination of multiple talk channels, or trunking, by connecting multiple repeaters operating in pseudo trunking mode. The system allows radios to use any of the idle repeaters in the system. The repeaters in an XPT site have similar power supplies, antenna, and associated equipment as a DMR Tier II or IP Connect repeater site, but XPT uses multiple repeaters. There is a maximum of eight repeaters at a single XPT site that provides a maximum of sixteen voice channels. The repeaters communicate with each other through a Layer-2 network switch.

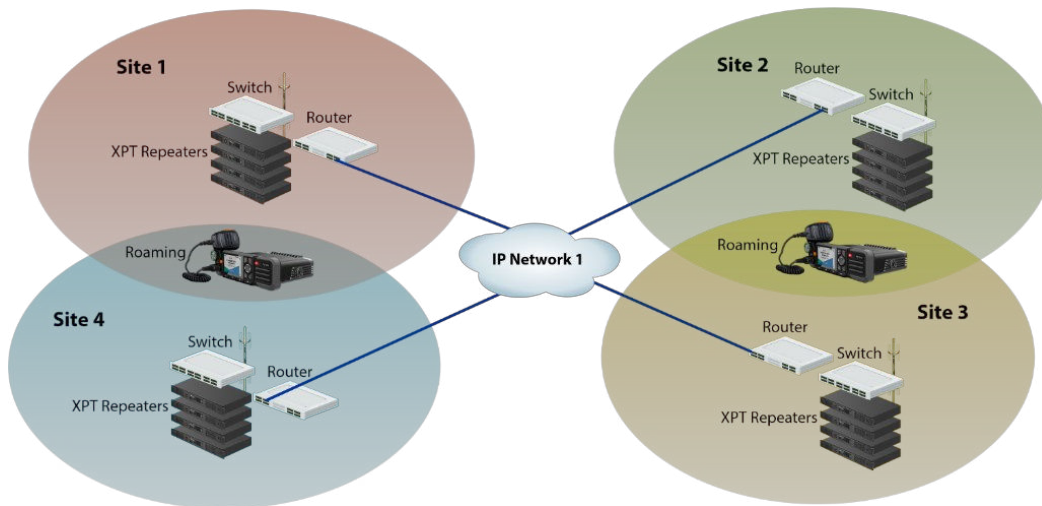
The repeaters consist of one Primary Repeater and up to seven Secondary Repeaters. There can be only one Primary repeater in an XPT system.



Multi-Site XPT

Multiple XPT systems at different locations can connect over an IP network like IP Connect, but with the added benefit of multi-channel trunking functionality to expand the calling capacity over all XPT sites. Group calls can be made across the IP network to other XPT sites.

XPT uses routers to connect each site to the IP network, with the XPT repeaters at each site connected to each other with a layer-2 switch. It is common for overlapping with XPT multi-site so roaming is a widely used feature.



DMR Tier III Trunking Systems

DMR Tier III Trunking is the pinnacle technology of radio communications systems and was developed using the ETSI DMR open standard and is designed for the most complex communications operations in large organizations. Since it is based on an open industry standard, multiple manufacturers provide Tier III compliant systems and radios. DMR Tier III is an IP-based digital trunking system designed to provide high-capacity individual and group calling, dispatching, and radio management capabilities across wide geographic areas.

DMR Tier III is an IP-based system with a centralized networking approach to intelligently manage resources. The DMR Tier III Trunking System consists of a central controller called a Mobile Switching Office (MSO), a Base Station Controller Unit (BSCU) server at each radio repeater site, multiple repeaters to carry the traffic, and a wide area network that connects all the different pieces together. Like IP Connect, IP network connectivity is provided by a variety of third-party internet, LAN, or VPN network operators. All the radio sites connect to the MSO, which provides routing functions, gateways to telephone networks and other systems, as well as managing the trunking of calls across the system. The MSO offers high availability standby, while multi-level fallback options can be deployed to ensure high reliability.

DMR Tier III requires a dedicated FCC FB8 frequency control channel that is always available for radios to register and request service from the network. The remaining channels in the system are allocated to the radio as they are needed and are therefore a shared or trunked resource called a traffic channel. As soon as a traffic channel is available, a user will be assigned to use the channel, without having to wait for a specific channel to become available.

DMR Tier III SMR Radio Networks

DMR Tier III systems are often deployed as Specialized Mobile Radio Service (SMR) networks. SMR networks are commercial radio networks that lease radios and wide-area network access. Operators of SMR networks are typically larger two-way radio dealers and system integrators that have spent considerable amounts of money on FCC frequency licenses and building out the networks that cover cities, counties, and even entire states.



DMR Tier III is often used in SMR networks because of the wide area scalability and roaming capabilities, the capacity for thousands of radio users, the mission critical reliability and security, and the ability to have granular control over the radios and their access to the network.

SMR network customers include municipal and county agencies, schools and universities, utilities, energy companies, hospitals and ambulance companies, tow truck companies, and other organizations that require reliable and cost-effective wide-area radio communications.

Benefits of DMR Radio Systems

Enhanced Coverage and Range – DMR systems significantly enhance coverage area. By strategically placing repeaters and antennas at elevated locations, these systems can extend the signal coverage area. Multiple repeater sites can be connected over IP networks for even greater coverage.

Improved Signal Quality – One of the primary benefits of DMR systems is the improvement in signal quality. The repeaters receive weak signals from portable or mobile radios and retransmit them at a higher power level, resulting in clearer and more reliable communication.

Increased Group Calling Capacity – With DMR Tier II, users can access the repeater and communicate with one another concurrently using TDMA technology. Multiple repeaters can be deployed and linked using XPT systems for high-traffic group calling in large organizations.

Scalability and Flexibility – DMR systems offer excellent scalability and flexibility. As the system's capacity is determined by the number of available channels, it can be easily expanded by adding more repeaters or increasing the number of available channels. This scalability enables organizations to adapt their communication infrastructure to growing needs without the need for a complete system overhaul.

Enhanced Privacy and Security – Encryption capabilities are built into DMR Tier II, ensuring that sensitive information remains protected and confidential. Additionally, repeaters can be configured with advanced access control features to limit unauthorized usage, providing an additional layer of security.

Digital Integration with Other Equipment– DMR radios support telemetry and programmable Input/Output (I/O) lines can control a vast array of hardware, essentially acting as a wireless Remote Terminal Unit (RTU). By mapping incoming over-the-air radio commands to physical hardware pins, operators can toggle electrical relays or monitor sensor changes over long distances without cellular infrastructure. Radios trigger relays to activate or shut down manufacturing machinery and equipment, and process automation controls, including PLCs. DMR radios can also detect contact closures on a variety of monitoring equipment.

Interoperability– This is a crucial advantage of DMR systems. DMR is an open digital radio standard, ensuring compatibility among different manufacturers' equipment. This allows organizations to choose from a wide range of DMR-compatible radios and infrastructure components, promoting interoperability and eliminating vendor lock-in.

Enhanced Management and Monitoring– DMR systems offer advanced management and monitoring capabilities. System administrators can remotely monitor and manage the repeaters, perform diagnostics, and optimize system performance. These features enable proactive maintenance, efficient troubleshooting, and swift resolution of any issues, leading to increased uptime and operational reliability.

Advanced Features and Functionality– Repeater systems offer additional features and functionality that can enhance operational efficiency. These include features like emergency signaling, remote monitoring, network connectivity, and dispatcher consoles.

DMR Systems Overview Comparison Table

System Type	Coverage	Call Capacity	Software and Features
Radio-to-Radio	Limited to the TX power of the radios	Two Slot TDMA, single channel with simplex calls	Group and individual calling, worker safety features, Bluetooth, and texting
DMR Tier II	Expanded coverage to larger sites using repeaters and antenna	Two Slot TDMA, single channel with full duplex calls	Dispatching, recording, and monitoring software, GPS location tracking, flexible system interconnects, and advanced encryption
IP Connect	Connects multiple Tier II repeater sites via IP networks	Two Slot TDMA, single channel with full duplex calls	All radio and DMR Tier II features, plus group calling across multiple remote sites
XPT	Same as a single XPT (Tier II) repeater site, and can connect multiple sites via IP networks	Pseudo trunking expands group calling capacity with up to 16 channels	All radio and DMR Tier II features, plus trunked channels to multiple remote sites
DMR Tier III	Wide area based on number of repeater sites and available frequencies	DMR Tier III trunking enables unlimited individual and group calls based on frequency availability and number of repeaters	All radio and DMR Tier II features, plus redundancy and resiliency, advanced security and access control, user management, and call prioritization

Part 2: Push-to-Talk over Cellular

PoC provides group communication services over both Wi-Fi, 4G, 5G, 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.

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.

NEXTEL

Today, PoC provides the best of both narrowband digital radios and broadband 4G/5G/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 4G/5G/LTE cellular networks provides the national coverage area and bandwidth required for modern data and video applications.

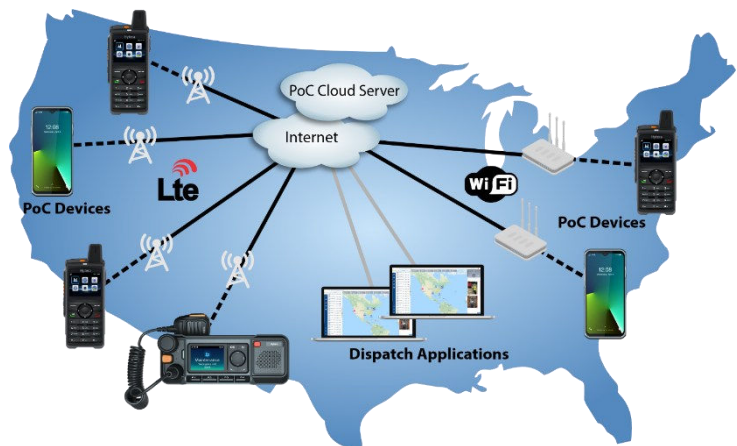
How PoC Works

PoC is also referred to as Radio over IP (RoIP). Similar to Voice over IP (VoIP), RoIP devices are handheld two-way radios that access cloud based PoC services via the internet for voice calling. A data plan SIM card (similar to those used in cell phones) is installed in the PoC device to enable access to the internet using the 4G/5G/LTE cellular infrastructure of Mobile Network Operators like AT&T, T-Mobile, and Verizon.

PoC radios are also known as Internet of Things (IoT) devices that access the internet for data communications and can also access the internet via Wi-Fi networks like any other mobile device.

PoC network services are typically hosted on the cloud using PoC cloud servers (also known as controllers or network appliances) that are operated by a PoC platform service provider. PoC servers can also be privately owned and operated by the customer. Gateway routers provide connectivity between the 4G/5G/LTE network and the cloud hosted PoC server. Dispatch Applications also connect to the PoC cloud server through the internet.

PoC radio services are typically purchased on a subscription basis. The subscriptions are available as low-cost annual plans that can include the PoC devices, or the PoC devices can be purchased and owned by the subscriber. The subscription costs include the SIM card which has a monthly service fee from the mobile cellular operator (AT&T or T-Mobile for example) to access the LTE network through the SIM data plan.



PoC Features and Benefits

Flexible Single-Site, Multi-Site, and Nationwide Coverage – PoC devices connect to nationwide cellular 4G/5G/LTE networks with the installation of a SIM card. PoC devices can also connect to Wi-Fi networks for single-site deployments, or multiple Wi-Fi sites can be connected over an IP Network. PoC systems can also support cross-enterprise calling, where group calls can be made between different companies with separate subscription plans on the same PoC platform.

No Radio Infrastructure or FCC Frequencies Required – Since the network infrastructure for PoC is existing cellular 4G/5G/LTE and Wi-Fi networks, there is no need to purchase, operate and maintain any traditional two-way radio network equipment. This reduces capital equipment costs and day-to-day operation and maintenance costs. PoC also eliminates the need for FCC radio frequency licenses, and in high-density urban areas there may be no frequency spectrum available.

Rapid Deployments – PoC systems can be deployed very quickly over existing cellular and W-Fi networks. PoC radios can be pre-configured with specific functions and call groups and work out-of-the-box with SIM cards pre-installed.

Instant Push-to-Talk Group Calling – PoC technology enables subscribers to make one-to-one (individual) calls or one-to-many (group) calls to separate groups of people at the same time. One press of a button on a rugged handheld device and you are talking to a predefined group or an individual. PoC devices also support group text messaging.

Encrypted Communications – PoC systems support the ARC4 (Alleged RC4) and AES (Advanced Encryption Standard) encryption algorithms to encrypt digital voice and data transmitted over the radio network. This digital encryption provides secure and private end-to-end communications, and if AES encryption is enabled, an AES cryptographic key is generated that enables the device access to the network, so only PoC radios with encryption enabled can be heard on the PoC system.

GPS Location Tracking and Dispatching – PoC devices with integrated GPS enable location tracking via a dispatcher application. This is an essential tool for managing, scheduling, and tracking vehicle fleets and remote teams in real time. PoC dispatch applications that support Geo Fencing enable alarm triggers when employees enter or exit the virtually defined territories. Dispatchers are typically web-based applications allowing for easy deployments and minimal start-up costs.

Multi-Carrier SIM Cards – Supports three mobile carriers and switches over when a carrier's signal is no longer present. If a carrier network drops coverage, the radio switches over to another carrier so the user can re-initiate the call. The primary carrier can be selected and programmed, then the SIM switches to the next strongest network available. This improves reliability and connectivity in areas where a carrier may not have adequate cellular coverage.

Cross Enterprise Calling – PoC systems support the ability to create talk groups with other companies that are subscribers to the same PoC subscription platform.

Unlimited Calling Capacity – PoC systems support unlimited talk channels and thousands of talk groups for scalable growth with large organizations.

Scalable for Small Businesses and Large Enterprises – PoC systems enable adding many users quickly to any size deployment, so they are scalable for small/medium sized businesses and large enterprises with thousands of users. Large Enterprises can have access to a PoC Systems Management Software and can run their own PoC system to:

- Define geographic segmentation for multiple locations so users only call other users at the same location
- Remotely manage and update call groups across the system
- Program radios in bulk, and add or remove users
- Generate network traffic reports for optimizing system configuration
- Enable privacy encryption levels
- Create a privately branded system with company logos on device and dispatch application screens

Types of PoC Devices

PoC devices come in various forms, including handheld radios, mobile radios, and smart devices. PoC radios are similar in performance and durability to DMR radios. They feature AHBased noise cancellation, long life lithium polymer batteries, LCD display screens, and emergency call buttons. They are also ruggedized with IP67 and IP68 ratings for water and dust protection, and MIL-STD 810 certified for impact resistance.



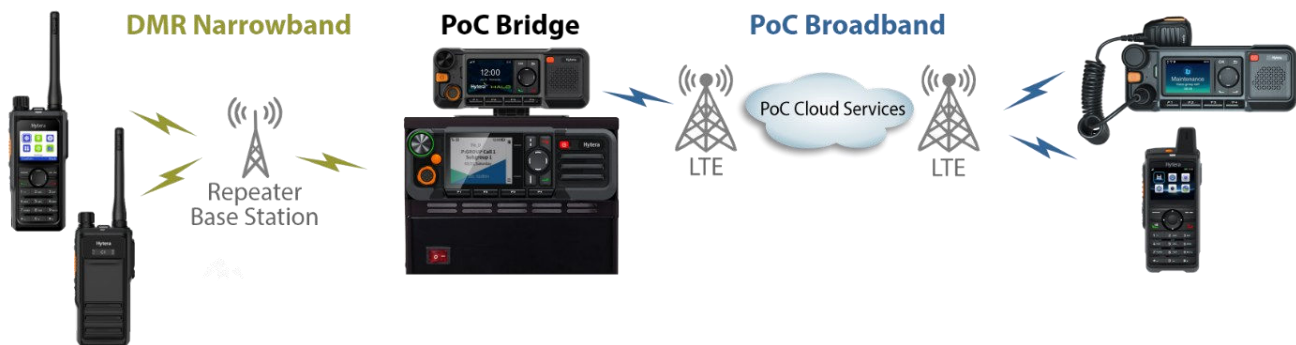
**PoC Mobile Radios
Handheld Radios
and Smart Devices**

PoC mobile radios are designed for in-vehicle use, providing safe and legal communication while driving. These radios feature loud audio and speaker quality, accurate GPS tracking, and built-in Bluetooth for hands-free operation. Mobile radios are essential for waste hauling companies that need reliable communication for their fleet operations.

PoC smart devices are handheld computers that run Android business apps (similar to modern smartphones), offering a unified platform for communication and mobile computing. These devices feature high-definition cameras, built-in infrared barcode scanners, and long-lasting batteries, making them a valuable tool for senior managers.

Part 3: Bridging PoC with Existing Radio Systems

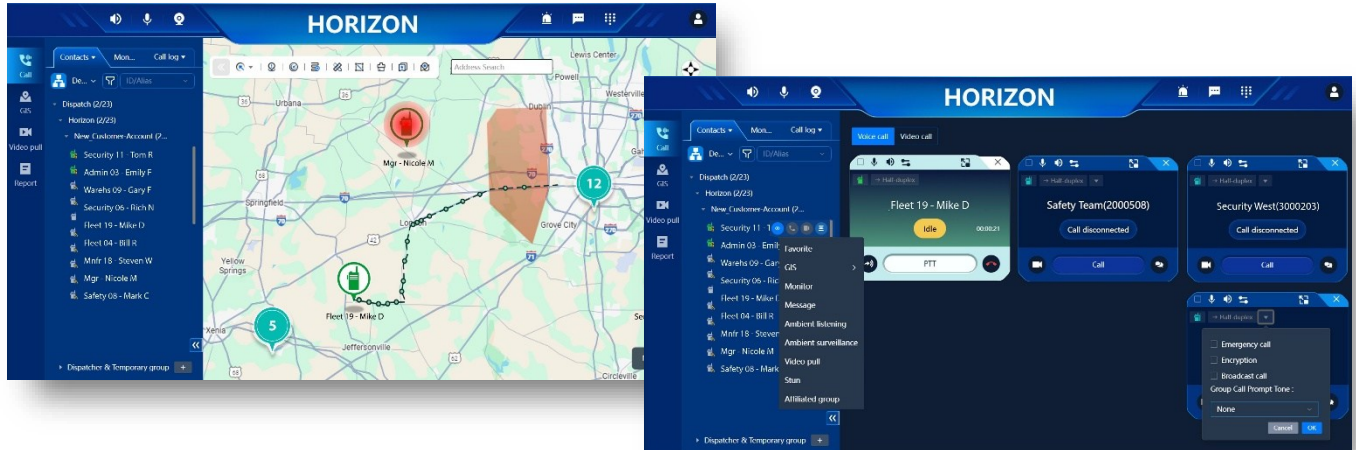
PoC bridging systems provide a simple, reliable, and cost-effective Radio over IP (RoIP) gateway between broadband PoC radios and a variety of existing narrowband DMR and analog radio systems. PoC bridging systems enable low-latency group radio calling connectivity between PoC radios and analog radios or DMR standards compliant radio systems. A typical use for a PoC bridge is adding fleet vehicle communications with PoC mobile radios to an existing single site DMR or analog radio system. This provides a cost-effective way to add PoC wide-area communications and preserves investments in existing DMR and analog radio systems.



The PoC bridge provides a single talk channel interconnect from PoC to DMR radios with a special mobile radio hardware and software system that interconnects and re-broadcasts communication between the PoC and DMR or analog radio systems. Multiple talk channels can be deployed between the two radio systems by installing additional PoC bridges.

Part 4: Dispatching Applications

Both DMR and PoC systems are available with Dispatch Applications, also known as Dispatch Consoles, they are software systems that enable centralized command and control of large radio systems. Group calls can be made to pre-programmed groups, or dynamic call groups can be built by selecting users from a list or within an area on the dispatch map. They provide the ability to make and monitor many individual and group calls, as well as build dynamic call groups on the fly from user lists or maps. They also provide comprehensive fleet dispatching and group calling interface for instant nationwide voice calling and GPS location tracking. Group calls can be made to pre-programmed groups, or dynamic call groups can be built by selecting users from a list or within an area on the dispatch map.



Dispatch applications can track multiple user locations and travel routes with job site time stamps to manage and dispatch vehicle fleets and remote workers. Dispatchers can draw geofences on the map to define boundaries for territories and service areas. Alarms can be generated when users enter or leave geofenced areas.

PoC Dispatch Applications are cloud-based apps that are accessible through a standard web browser. They are available on a subscription basis and are very cost-effective.

DMR Dispatch Applications use many different architectures, but they are typically server-based applications that require dedicated servers. Since they are server-based, they are more expensive than PoC dispatch applications. DMR dispatch applications offer some added functionality not found in PoC Dispatch applications. These include the ability to be integrated with IP camera systems and pull video feeds into the application. They are also easily integrated with other radio systems with different protocols such as P25 and analog systems.

Part 5: DMR and PoC Comparison

DMR and PoC Similarities

Both PoC and DMR radios share many features and capabilities.

Durability – Both PoC and DMR Radios are ruggedized with IP67 and IP68 ratings for water and dust protection, and MIL-STD 810 certified for impact resistance. DMR radios add some durability features like water porting speakers, and DMR radios are also available in Intrinsically Safe models for use in areas where explosive gas and dust are present. Note that there are many low-end, consumer-grade PoC radios that are not durable and long lasting.

GPS Location Tracking and Dispatching – Available on both DMR and PoC radios for use with map-based, location tracking dispatch applications.

Long Battery Life – Professional PoC and DMR radios have lithium polymer batteries that provide up to 24 hours on a single charge. Compact PoC radios can deliver up to 40 hours on a single charge.

Encrypted Communications – PoC and DMR radios are available with end-to-end encryption with advanced AES and ARC4 encryption algorithms.

Call Types – Both PoC and DMR radios support the following call types:

- Group Call – a one-to-many call, and probably the most often used type of call
- Private Call – Individual radio-to-radio calls
- Emergency Call and All Call – A special call that will broadcast to every radio on a channel, or all the radios on the system.
- Text Messaging – Free form texting, or text messages can be pre-programmed to specific buttons
- Video Calls – Only PoC devices with cameras make video calls

Zones – Both PoC and DMR radios with screen interfaces enable organizing call groups into zones.

Key Differences

There are some key differences between LMR/DMR radio systems and PoC systems:

Physical Form Factor – PoC handheld radios are slightly smaller and lighter than DMR radios and have compact integrated LTE antennas. DMR Radios have detachable (with SMA screw) whip or stubby antennas. PoC mobile radios are dramatically smaller and lighter than DMR mobile radios. PoC mobile radios are about the same size as a DMR radio faceplate head and can be mounted on a vertical or horizontal surface.

Frequencies – LMR/DMR systems require FCC licensed UHF and VHF frequencies, while PoC uses existing LTE networks, so no frequency licenses are required.

Range – The range of LMR/DMR systems depends on the radio system infrastructure, while PoC provides nationwide coverage based on the mobile carrier's coverage area.

System Reliability – LMR/DMR radio systems are the most reliable communication systems available and are often the “last man standing” during natural disasters and widespread power outages. If your organization requires mission-critical guaranteed up time, then DMR systems are the better choice. PoC systems are based on the reliability of mobile carrier's cellular network, and the reliability and redundancy of the PoC servers. While highly reliable, there can be wide-area cellular outages that will impact PoC services.

Channel Capacity – DMR systems can support many calling channels (up to 1,024) and talk groups, but the overall system calling capacity is based on the system infrastructure. PoC systems provide unlimited talk channels and call groups.

Cross Enterprise Group Calling – PoC systems support the ability to create talk groups with other companies that are subscribers to the same PoC subscription platform. Cross-enterprise calling is also available on DMR radio systems, but it is more expensive and complex. DMR systems require a cross patch through software on a server-based dispatch console or physically connecting radio equipment through hardware gateways.

Part 6: Hytera DMR and PoC Solutions

HORIZON Push-to-Talk over Cellular

HORIZON

[HORIZON](#) is a subscription-based Push-to-Talk Over Cellular (PoC) service that provides instant individual and group calling over the most advanced and reliable cloud-based communications network. HORIZON utilizes the 4G/5G/LTE cellular infrastructure of Mobile Network Operators and Wi-Fi networks to access the cloud-based PoC servers. 4G/5G/LTE cellular networks enable unlimited coverage area, so radio users are untethered by the range of repeaters and base stations used in traditional radio networks.

HORIZON has unparalleled reliability and service availability with high-performance and high-capacity cloud servers with geographically diverse failover. So even if an entire data center goes down, the servers will switch to new redundant location so there is no service outage to HORIZON subscribers.

HORIZON supports all the rugged and feature rich Hytera PoC devices.

Hytera PoC Devices

Hytera provides a wide variety of PoC handheld radios, PoC mobile radios, and PoC handheld smart devices. These compact, rugged, and easy-to-operate handheld devices enable group voice communications over Wi-Fi and nationwide cellular 4G/5G/LTE networks.



The key features of the Hytera PoC devices:

- High-quality devices backed by a two-year warranty
- Wide variety of device types and features to align the devices with any organizations' specific needs
- AI-Based noise suppression and high-volume speakers for industry-leading voice quality in loud environments
- Built-in Wi-Fi that automatically switches over to the LTE network when out of Wi-Fi range
- GPS enables tracking and positioning for the dispatching application
- Ruggedized to IP67/IP68 and MIL-STD-810 G/H standards
- Supports instant individual and group calling and texting, and sharing pictures and videos
- Mobile PoC radios are DOT approved and legal to use in vehicles while driving
- Car kits are available for specific handheld PoC radios to provide safe, and DOT approved use in vehicles
- Powerful battery provides reliable operation for over 24 hours
- Multi-unit chargers available for most PoC handheld devices
- Built-in Bluetooth supports wireless connection with audio accessories for hands-free operation
- PoC handheld smart devices run any Android business app for a true unified communication device

Hytera BRIDGE PoC Radio Gateway

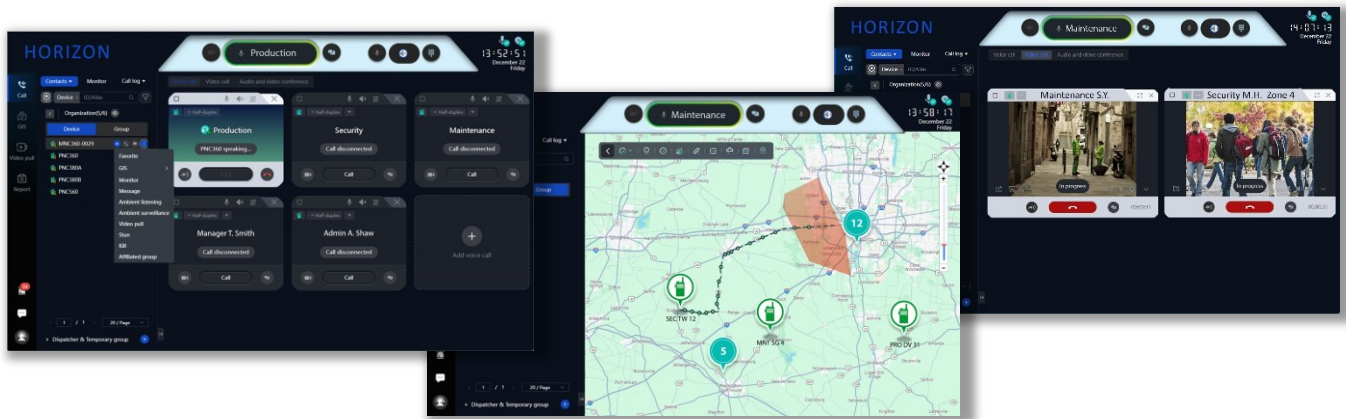
[Hytera Bridge](#) is a Radio over IP (RoIP) gateway that enables connectivity between PoC radios and existing Analog and DMR standard compliant and radio systems. Add nationwide PoC communications to existing two-way radio systems with simple, reliable, and cost-effective radio system gateway.

- Delivers low latency communications between PoC and DMR radios
- Enables a variety of flexible system interconnect configurations
- Preserves investments in existing DMR and Analog systems



HORIZON Dispatch

[HORIZON Dispatch](#) is 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.



HORIZON 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. HORIZON Dispatch supports call record storage and reporting to instantly review, play, search, and export logs for calls, messages, emergency alarms, geofencing alarms, and overspeed alarms.

Hytera H-Series DMR Two-Way Radios

The New Standard in Quality and Performance

The [Hytera H-Series family](#) of handheld and mobile radios is the new standard in functionality, user experience, ruggedness, and scalability.

Industry Leading Audio Quality – Large speakers provide up to 93dB of loudness, and AI-based voice enhancement with deep learning ability that can accurately extract voice from noise in real time.

Greatest Coverage Range – The H-Series extends radio range through increased Tx power, Rx sensitivity, improved antenna gain, and reduced attenuation. This produces a 25% increase in coverage distance and signal penetration through buildings to improve efficiency and reduce costs.

Lightest and Thinnest Radios – H-Series handheld radios have an optimized mechanical design, advanced materials, and lightweight lithium polymer batteries. HP7 radios weigh less than 11 ounces, and HP6 radios weigh less than 10 ounces.



Highest Level of Ruggedness – The HP7 and HP6 handheld radios are IP68 and MIL-STD-810 G compliant. They are dustproof, submersible to a depth of 2 meters for 4 hours, and withstand multiple drop shock tests at 2 meters. H-Series handheld radios also feature an anti-magnetic speaker that does not attract magnetic metal dust and shavings, and the speaker automatically drains water after being submerged.

Longest Battery Life – The latest in lithium polymer technology is used to power the H-Series handheld radios. The battery is light and small, achieving a shift life of up to 24 hours on high transmit power with a duty cycle of 5/5/90.

Multi-System Operation – H-Series radios can be deployed on Analog and Digital Conventional, XPT Trunking, DMR Tier II Trunking, IP Multi-Site Connect, and DMR Simulcast systems. HP702, HP782, and HM782 radios can be deployed on DMR Tier III systems.

Advanced Features – H-Series radios support GPS for dispatching applications, text messaging, advanced encryption, and Bluetooth for wireless accessories. HP7 radios support the advanced network system features including roaming, radio registration service, and telephone calls.

Worker Safety – Worker safety features included dedicated emergency buttons, Man Down, Lone Worker, Priority Interrupt, Remote Monitor, and Stun and Revive.

Hytera DMR Radio Systems

H-Series DMR Tier II Repeaters

HR1062 DMR Repeater – The HR1062 is the new state-of-the-art in digital radio communications, providing a more efficient experience with loud and clear audio, support for multiple types of radio and communications systems, and extended range.

The HR1062 features AC and DC auto-switching power, two simultaneous TDMA voice channels, high performance cooling, and all in a compact 1U form factor. The repeater supports IP-Connect, and XPT systems with license upgrades.



HR652 Compact DMR Repeater – The Hytera HR652 is the next generation compact DMR repeater designed to expand the communication range of DMR radios. The HR65X can be mounted on a flat surface or used in portable applications. With a compact body and built-in duplexer, the HR65X has a compact form factor for installation at sites with very limited space. The HR652 supports IP-Connect with a license upgrade.



IP Connect

Hytera's IP-Connect provides wide area connectivity between Hytera DMR Tier II repeaters deployed with a simple license upgrade to Hytera DMR Tier II repeaters. Hytera DMR Tier II repeaters feature built-in Ethernet ports for the required IP network connectivity via network routers.

Hytera XPT Single Site and Multi-Site

Hytera's exclusive Extended Pseudo Trunk (XPT) expands the calling capacity of Hytera DMR Tier II repeaters by up to 16 voice channels and supports over a thousand users. XPT systems can also grow beyond the local footprint by connecting distant XPT repeater sites via routed IP connections. XPT is very cost effective and is deployed by adding a layer 2 network switch and XPT licenses to multiple Hytera repeaters.



DMR Tier III

Hytera was the first company to deploy a fully functional DMR Tier III trunking system and is the only company that provides DMR Tier III systems with comprehensive standard compliance.

DS6210 DMR Tier III Pro System – The DS6210 DMR Tier III Pro has blade architecture for easy installation and system scalability. It accommodates redundant controllers and power supplies in the same cabinet for immediate fail-over in the unlikely event of a blade card failure. The system is supplied in fully configured cabinets ready for final site installation.

The DS6210 DMR Tier III Pro repeater site channels have triple receive diversity to enhance the uplink receive signal for all field radios and improves the uplink reliability for portable radios at the edge of coverage.



About Hytera US Inc

Hytera US Inc is a US corporation with offices, warehouses, and support facilities based in Irvine, California and Sunrise, Florida.

Hytera US Inc is a solution provider whose core area of expertise is providing cost-effective radio communications systems of the highest reliability, durability, and quality.

Hytera US Inc is a rapidly growing company with an expanding US radio communications market share. Our solutions are provided to a broad base of customers that range from small to medium sized businesses, Fortune 500 companies, and other organizations. There are hundreds of thousands of users nationwide from the industrial, education, hospitality, transportation and logistics, security, construction, energy, and health care markets.



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Hytera PoC DMR White Paper vA

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