Comparison of PoC vs. two-way radio (TETRA, DMR and P25)

Traditional two-way radios have been at the forefront of many industries for decades. However, in today's world, where efficient communication is the backbone of business success, many organisations are reporting that their traditional two-way radios are unable to provide the service they require.

As cellular networks grow ever stronger, the market is recognising that the limitations of radio technologies can be overcome by push-to-talk over cellular technology (PTToC, also known as PTT, PTX and PoC). Unlike two-way radio systems, PoC is able to offer stable, clear, secure communication across vast distances without the need for physical repeaters and base stations. What's more, strong growth in satellite communications and private networks is now bringing connectivity to the hardest-to-reach locations, enabling reliable communication, even if there's limited cellular coverage.

An additional advantage of PoC applications is that they include an extensive and affordable feature set, particularly compared to two-way radios. In addition to allowing instantaneous 121 and group voice communication, these features enable images, files, videos and messages to be shared at the touch of a button. They also include real-time GPS location tracking and reporting, live video communication, SOS emergency alerts, man down and lone worker features. All fully integrated and available on one device.

PoC systems frequently incorporate robust end-to-end encryption and security features, ensuring that sensitive information remains safeguarded during transmission. In addition, Mobile Device Management (MDM) enables device functionality to be controlled, configured and limited, according to needs.

The following table compares PoC with two-way radios (TETRA, DMR and P25) **in key performance areas**

Factor	PoC	Two-Way Radio (TETRA, DMR + P25)
Network Reliability		
Network Dependency	Relies on cellular networks (2G – 5G), Wi-Fi or private LTE for operation.	Operates on dedicated radio frequencies independent of cellular infrastructure.
Network Coverage	Provides global coverage through cellular and internet connectivity (as long as the network is available).	Limited by the range of the radio repeater or direct line of sight (typically 1 – 50 miles, dependant on hardware equipment).
Network Interference	Not prone to interference in cellular networks, though operation dependant on network congestion. QoS configuration can override congestion of cellular networks.	Prone to interference from overlapping radio frequencies, environmental factors or equipment limitations.
Network Redundancy	Cellular networks often have failover mechanisms but reliant on infrastructure makes them vulnerable in areas with no coverage. Mutli-network SIM cards can be deployed and used to overcome this.	Reliable with areas within the radio's infrastructure range.
Signal Strength		
Signal Quality	Consistently strong in areas with robust cellular or Wi-Fi coverage.	Signal strength decreases with distance or obstructions (e.g buildings, hills) due to line-of-sight dependency.
Range	Virtually unlimited when cellular coverage exists; no practical range limitation within connected networks.	Limited range, typically 1-5 miles for handheld radios or 20-50 miles with repeaters in prime optimal conditions.
Obstruction Handling	Cellular towers and advanced networking migrate most signal obstructions.	Signal strength is significantly affected by physical barriers.

Factor	PoC	**Two-Way Radio** (TETRA, DMR + P25)
Scalability		
Number of Users	Scales easily with additional users and supports large number of users within a radio talkgroup.	Limited by frequency allocation and channel availability, making it less scalable for very large teams.
Infrastructure	Cellular towers and data centres usually share critical resources, making large-scale operations possible.	Requires dedicated repeaters and frequencies, which may not be available in crowded radio spectrum. Also relies on dedicated specialised staff to manage and maintain infrastructure.
Audio Quality		
Clarity	Superior audio quality with modern voice codecs over cellular networks.	Audio can degrade with distance, interference or weak signals.
Latency	Low latency with modern cellular networks.	Virtually no latency due to direct transmission.
Cost Efficiency		
Initial Costs	Lower upfront costs as solution uses existing cellular devices and PoC software applications are very much affordable. PoC software may be bought through a perpetual up-front lifetime licence cost.	Very high initial upfront costs due to the need for specialised equipment (radios, repeaters, antennas etc). Radio costs of two-way radios compared to PoC are generally significantly more expensive too.
Operational Costs	Ongoing cellular data costs and/or subscription fees for PoC software and services.	Maintenance costs for equipment/hardware if using repeater systems. May be ongoing licences costs with spectrum.

Integration with existing two-way radio systems

For two-way radio users wishing to either trial or transition to PoC technology without additional investment, there is a requirement for interoperability with PoC technology. A standalone Radio over IP (RoIP) Gateway is a cost effective and easy-to-install way to integrate two-way radio systems with PoC radios and smartphones, enabling teams to continue using the same radios whilst they are trialing or migrating to PoC.