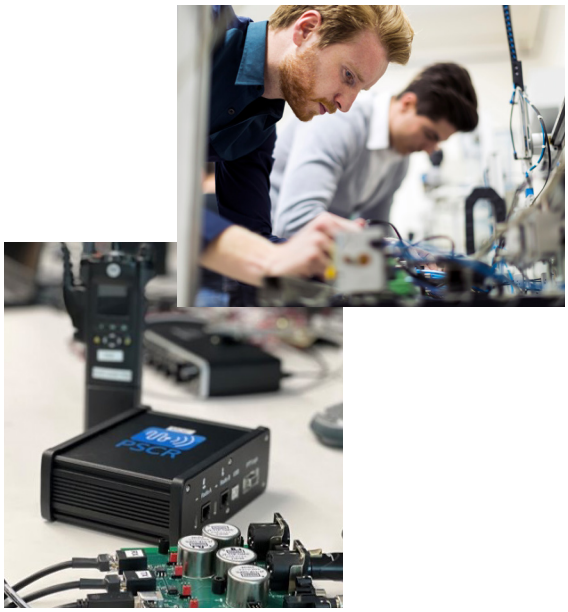
NIST COMMUNICATIONS TECHNOLOGY LABORATORY

Mission Critical Push-to-Talk

Standards-Compliant Certification for First Responders

Overview

The Public Safety Communications Research (PSCR) Division at the National Institute of Standards and Technology (NIST) Communications Technology Laboratory (CTL) has facilitated the first-ever standards-compliant certification program for Mission Critical Push-to-Talk (MCPTT) applications. By bridging public safety requirements with the global 3rd Generation Partnership Project (3GPP) standards process, PSCR created the framework, test cases, and equipment needed for third-party certification of mission critical services (MCX) applications, ensuring reliable, interoperable communications for first responders. The Mission Critical Services Standards Initiative seized a key opportunity by advancing conformance testing, which was previously limited to mission critical hardware, to encompass mission critical software, ensuring these applications meet established standards.



Resources

For more details on NIST PSCR, visit their official page:
https://www.nist.gov/ctl/pscr

Timeline of Major Milestones

2016: Technical Contributions to 3GPP
PSCR began serving as rapporteur for MCX conformance tests within 3GPP, leading the development of multiple test specification releases for MCPTT, MCData, and MCVideo.

2017: Development of Mission Critical Voice (MCV) Quality of Experience Key Performance Indicators (QoE KPIs)
PSCR defined the first MCV QoE KPIs, including mouth-to-ear latency, end-to-end access time, speech intelligibility, and probability of successful delivery establishing a replicable measurement framework to evaluate communication effectiveness under real-world conditions.

2018: Commercial and Operational Execution of MCPTT Test Specifications
PSCR-authored 3GPP test specifications were translated into executable code, leading to implementation in commercial test equipment by firms like Rohde & Schwarz and Keysight, with validation through international Plugtests.

2019: NIST Awards Grant to Mission Critical Services Testing as a Service Project and Keysight Procurement
PSCR awarded a grant to the MCS Testing as a Service project (MCS Taasting), intended to develop and validate flexible MCS standards testing tools and associated certification procedures and procured software development for MCX conformance tests via the Keysight UXM platform to advance a fifth generation (5G)/ long-term evolution (LTE) protocol conformance toolset, enabling formal verification of 60% of MCPTT test cases—a critical threshold for certification bodies.

2024: Third-Party Certification Labs Launched
Mission Critical Operators joined the Global Certification Forum (GCF) —a conglomerate of global telecommunications operators (e.g., AT&T, Orange, and Vodafone), manufacturers (e.g., Samsung and Motorola), and test equipment suppliers (e.g., Rohde & Schwarz and Keysight)—to enable third-party certification labs to provide MCX conformance testing (up to four labs in 2024).

GCF certified the first MCPTT application, supported by tools developed under PSCR grants, marking the first time 3GPP standards compliance was extended to application-layer mission critical services.

2026: Next Steps
PSCR is collaborating with the GCF to incorporate QoE KPIs and relevant metrics into future performance standards, expanding evaluation beyond simple standards compliance to include performance quality and user experience metrics.

Why It Matters

By creating the first complete conformance testing ecosystem for MCX applications, PSCR has ensured that first responder communications technology can be evaluated against the same rigorous interoperability standards applied in the commercial telecommunications sector. This achievement directly improves the reliability, quality, and security of mission critical communications. The certification framework allows public safety agencies to adopt broadband-based MCX applications with greater confidence, knowing they meet internationally recognized 3GPP standards.