

Voice over Internet Protocol Profile Validation Report

Bridging Systems Interface Core Profile Version 1.1

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**Homeland
Security**
Science and Technology



The U.S. Department of Homeland Security's Office for Interoperability and Compatibility and the U.S. Department of Commerce's Public Safety Communications Research program are leading the Public Safety Voice over Internet Protocol (VoIP) Working Group to address the lack of interoperability between VoIP-based devices.

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I. Background

The Nation's first responders typically use two-way radios—known as land mobile radios (LMR)—to communicate with each other when responding to incidents. However, even the most technologically advanced of these radios are often not interoperable with each other because they broadcast in different frequency bands. To connect disparate radio systems, first responders rely on bridging solutions, which are increasingly using Voice over Internet Protocol (VoIP) technology to transmit data and voice communications. Although based on Internet Protocol, VoIP technology is not always interoperable because it can be implemented in a number of different ways that are essentially proprietary. As a result, there is no guarantee that one manufacturer's VoIP-based equipment will connect to another.

The U.S. Department of Homeland Security's (DHS) Office for Interoperability and Compatibility (OIC) and the U.S. Department of Commerce's Public Safety Communications Research (PSCR) program are leading the Public Safety VoIP Working Group to address the lack of interoperability between VoIP-based devices. Rather than going through the lengthy process of creating new standards, this coalition of public safety first responders, industry representatives, and Federal partners created VoIP specifications, or implementation profiles. A VoIP implementation profile is a collection of existing standards, parameters, and values necessary for VoIP-based devices to connect with one another. Bridging systems with interfaces built to these specifications will allow first responder agencies to seamlessly connect radio systems over an IP network—regardless of the manufacturer.

Purpose

During the September 2009 VoIP Working Group Roundtable meeting, attendees determined that the profile needed to be tested under real-world conditions before being published and made available to the general public.

The testing performed in this report validated the specifications in the Bridging Systems Interface (BSI) Core Profile Version 1.1 as developed by the Public Safety VoIP Working Group.

II. Participants and Technology

During Super Bowl XLVI, the City of Indianapolis Division of Homeland Security, Boise Fire Department, and PSCR conducted testing of the BSI Core Profile Version 1.1 using the following equipment:

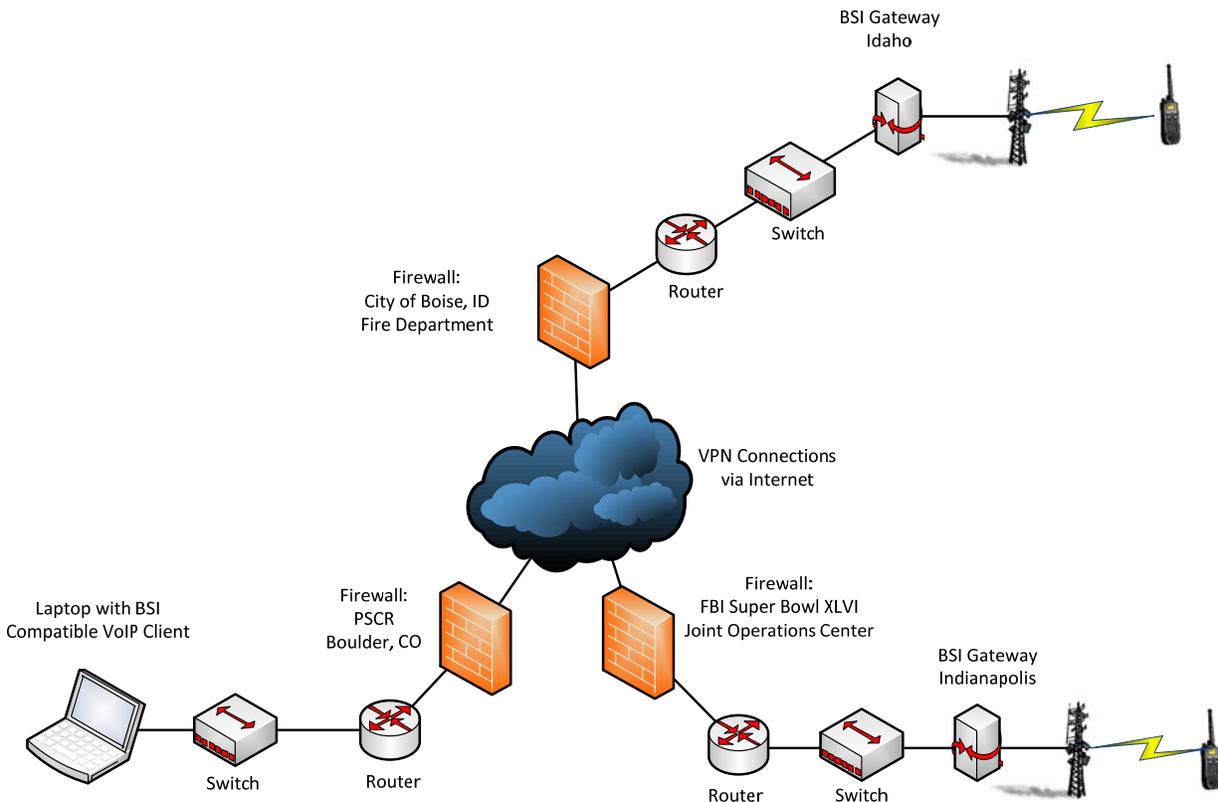
Participating Agency	Equipment	Project 25 (P25) Compliant
City of Indianapolis Division of Homeland Security	Sytech Corporation, R.I.O.S Gateway Device	Yes
Boise Fire Department	Communications Applied Technologies, I.C.R.I. Gateway Device	Yes
PSCR	X-Lite Softphone	N/A

Basic Configuration

The Federal Bureau of Investigation (FBI) Super Bowl XLVI Joint Operations Center, City of Indianapolis Division of Homeland Security, Boise Fire Department, and PSCR provided the following:

- Donor Radio – programmed
- Talkgroup – assigned interoperable talkgroups for the exercise
- BSI Gateway configured to support Version 1.1 profile
- Proper interconnect cables between donor radio and BSI gateway

Below is a graphic that shows what happened during the BSI demonstration at Super Bowl XLVI. Using the FBI Super Bowl XLVI Joint Operations Center, the demonstration team used a radio and the BSI profile to make contact with a practitioner in PSCR Boulder Labs, Colorado.



III. Testing Methodology

All test participants had verified the functionality of each agency's device, radio networks, and connectivity prior to the implementation of the test. OIC provided a phone bridge that was used for coordination during set-up and for configuration support as needed. After verification from

OIC (and/or PSCR), the test was completed and agencies could breakdown the patches that were used to connect their networks.

- City of Indianapolis Division of Homeland Security provided interoperable talkgroups on a P25 radio system.
- OIC provided a VoIP Gateway device and cabling that was able to connect to a Motorola XTS-5000 or XTS-2500 portable radio.
- City of Indianapolis Division of Homeland Security provided IP connectivity on the day of the test with its network wires.
- PSCR provided technical support and exercised control to establish the required parameters and results.

IV. Key Findings

Below is a list of key findings gathered through interviews with the BSI demonstration participants:

- The BSI Core Profile Version 1.1 successfully connected participants at the Super Bowl XLVI in Indianapolis, Indiana, to another practitioner in Boulder, Colorado.
- The voice and sound quality from the BSI Core Profile Version 1.1 was strong and clear.
- The BSI Core Profile Version 1.1 was not seen as a “plug and play” solution due to the number of steps needed to set up the equipment, but it was seen as a valuable tool for first responders to use for monitoring and gathering real-time intelligence because it enabled first responders to continually communicate with forward-deployed assets (i.e., first responders sent out in the field to help with an incident).
- The BSI Core Profile Version 1.1 equipment allowed first responders to communicate with responders in other locations that currently were hard to access due to their remote locations and lack of an easily accessible network connection.
- The BSI Core Profile Version 1.1 was seen as a powerful tool for providing interoperability between disparate systems, but would not be good to use when trying to monitor time-critical events due to the time it takes to set up the equipment for the profile.
- Setting up equipment for the BSI Core Profile Version 1.1 was not very intuitive; however, if technological support was provided, then the effort would be manageable.

V. Conclusion

Testing concluded that the BSI Core Profile Version 1.1 meets the needs of public safety to create an interoperable environment. The demonstration showed that the profile can be a valuable tool for first responders to monitor and gather real-time intelligence. The profile gives first responders the ability to communicate with practitioners that are deployed in areas with limited network coverage. The profile also provides first responders with a powerful tool that can provide interoperability between disparate systems with great voice and sound quality. The BSI Core Profile Version 1.1 may not be a “plug and play” solution for first responders, but it does provide the capability gather the information they need to make informed decisions while in the field.

Overall, demonstration participants felt that the BSI Core Profile Version 1.1 test at Super Bowl XLVI was a success. When interviewed by KTVB.com about the BSI pilot, Paul Roberts from Boise Fire Department said “It’s been a great experience. Learning a lot and probably a lot of information that I can take back to help local emergency responders in the Boise area.” In order to increase awareness on the BSI Core Profile Version 1.1 demonstration, participants suggested the profile should be provided to other first responders to test and use. The group suggested that the BSI Core Profile Version 1.1 should be provided to other public safety agencies and public safety organizations to test and use (e.g., American Red Cross, Federal Emergency Management Agency (FEMA), etc.). It is recommended that public safety agencies use the BSI Core Profile Version 1.1 to improve interoperable communications when trying to connect their legacy systems to a new system.

VI. Acknowledgements

OIC and PSCR would like to thank everyone who helped plan and execute the BSI Core Profile Version 1.1 demonstration during Super Bowl XLVI. Each demonstration participant played an integral part in drafting the test plan and scenarios, setting up the equipment, and doing the actual demonstration at Super Bowl XLVI. Without their hard work and extra effort, this demonstration would not have been successful. OIC and PSCR would like to send a special thank you to the following people:

<u>Name</u>	<u>Agency</u>
Ken Link	New Jersey State Police Office of Emergency Management (OEM)
Paul Roberts	Boise Fire Department
Ashley Strickland	City of Indianapolis Division of Homeland Security