Project 25
Testing in Development

Presented by:
PTIG - The Project 25 Technology Interest Group
www.project25.org – Booth 2761
New P25 ISSI Interoperability Testing Solution

What is New
• ISSI Interoperability Field Testing
• Acceptance, Certification & Validation
• A2LA Accredited Test Lab

P25 Testing Solution
• Test actual installed FNE’s via VPN

Benefits to Public Safety
• Ensure the ISSI really works
• Verify systems work after a long time inactive
• Validate systems prior to purchase or post installation
• Interoperability is Real world
  • Can you hear me now?
  • Watch the system work or not work

Is your P25 system compliant? Will your ISSI work?

https://compliancetesting.com/
ChrisL@compliancetesting.com
480-748-4449
Actual ISSI Site to Site Image
Interoperability

• Testing actual installed systems
• Seeing and hearing the results builds confidence
• Accounts for the actual implementation & configuration of the system itself
• If the standard is deficient, improve the standard, [this is normal new standard maturation process]
Valid8 P25 ISSI/CSSI Testing

Pick the form-factor that best suits your needs:

✓ Virtual Machine
✓ Panasonic Toughbook
✓ Dell/HP 19” server
✓ Valid8 M-series HW
**A. ISSI Testing – DUT = RFSS**

### 3 Options to Perform ISSI testing with the Valid8 Tester

1. **Using a VPN**
   - Valid8 provides method to set up VPN & credentials
   - Customer provides Valid8 for configuration:
     - DUT IP Address
     - DUT WACN ID, System ID, Group ID, Unit ID
     - DUT Subscriber Unit
   - Customer configures DUT with:
     - Valid8 IP Address
     - Valid8 WACN ID, System ID, RFSS ID, Group ID, Unit ID
     - (need to check test spec to see if other parameters needed)

2. **Using Customer Lab**
   - Customer purchases Valid8 software to install on:
     - Server meeting minimum requirements for software
     - VM
   - Valid8 provide training on how the customer may configure the Valid8 tester to perform ISSI testing against their DUT

3. **Using Valid8 Lab**
   - Customer provides DUT/Console hardware
   - Customer provide training and remote assistance to Valid8 on configuring the DUT/Console for the tests
   - Valid8 runs the tests and provides results to the Customer.
B. CSSI Testing – DUT = Console

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     - Valid8 WACN ID, System ID, RFSS ID, Group ID, Unit ID
     - Valid8 Subscriber Group (SGID)

2. Using Customer Lab
   - Customer purchases Valid8 software to install on:
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Customer DUT = RFSS 1

DUT
RFSS Home

DUT IP Address
DUT WACN ID
DUT System ID
DUT RFSS ID
DUT Group ID
DUT Unit ID
Valid8 Subscriber Group (SGID)

DUT Subscriber Unit

Valid8 provides remote support

DUT

ISSI 1Gb Ethernet LAN or VPN

SU1
Valid8 Subscriber Unit

RFSS Serving 1

Valid8 IP Address
Valid8 WACN ID
Valid8 System ID
Valid8 RFSS ID
Valid8 Group ID
Valid8 Unit ID
Valid8 Subscriber Group (SGID)

SB1
Valid8 Subscriber Group = RFSS 2

ISSI 1Gb Ethernet LAN or VPN

Valid8 Subscriber Group

DUT IP Address
DUT WACN ID
DUT System ID
DUT RFSS ID
DUT Group ID
DUT Unit ID
Valid8 Subscriber Group (SGID)
Testing Indoor Public Safety Radio Communication
SeeHawk® Touch and IBflex®

What is New

• Fast and cost effective radio tests to obtain building occupancy permit
• Grid test based on NFPA, IFC, and AHJ regulations
• Automatic report generation for submission

P25 Interoperability solution

• P25: RSSI, SINR, Frame BER, Phase detection
• FirstNet Measurements: multiple bands/operators
• Future proof: 5G, CBRS, NB-IoT
• RSSI on other technologies

Benefits to Public Safety

• Ensure indoor communications for first responders
• Makes adopting and enforcing requirements realistic

Verifying Indoor Performance: What Are the Test Requirements?

### Typical AHJ Requirements

<table>
<thead>
<tr>
<th>Requirement Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid of “20 equal areas”</td>
<td>on each floor</td>
</tr>
<tr>
<td>Test each area in one “center” spot</td>
<td>only</td>
</tr>
<tr>
<td>Minimum signal strength level</td>
<td></td>
</tr>
<tr>
<td>Minimum signal strength level sufficient for DAQ 3.0, or SNR</td>
<td>both in and out</td>
</tr>
<tr>
<td>Grade areas: thresholds for test items</td>
<td></td>
</tr>
<tr>
<td>Test critical points, different criteria</td>
<td></td>
</tr>
<tr>
<td>Grade floor / building: x% tested areas</td>
<td></td>
</tr>
<tr>
<td>Signed record, AHJ approved person</td>
<td></td>
</tr>
<tr>
<td>Radio or AHJ approved equipment</td>
<td></td>
</tr>
<tr>
<td>Annual retests, compared to first test</td>
<td></td>
</tr>
</tbody>
</table>

**Execute Test, Grade By Threshold Report Automatically in Real Time**

- Power by Channel
  - -120
  - -100
  - -80

1. 1
2. 2
3. 3
PCTEL’s Public Safety Test Solution Implements Grid Testing Requirements

Automating Grid Creation

Simple Test Execution

Results in Real Time

Streamline Reporting

<table>
<thead>
<tr>
<th>Area</th>
<th>Area #</th>
<th>Channel</th>
<th>Frequency (MHz)</th>
<th>Threshold (dBm)</th>
<th>Power (dBm)</th>
<th>Loss (dBm)</th>
<th>Voice Test</th>
<th>Result</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>01</td>
<td>5230</td>
<td>755.60</td>
<td>-95.00</td>
<td></td>
<td></td>
<td></td>
<td>Fail</td>
<td></td>
</tr>
<tr>
<td>01</td>
<td>01</td>
<td>5780</td>
<td>755.60</td>
<td>-95.00</td>
<td></td>
<td></td>
<td></td>
<td>Fail</td>
<td></td>
</tr>
</tbody>
</table>
New P25 Over-the-Air Radio Diagnostics for Large Coverage Deployments

What is New

- MX-3000 Master device accommodates the requirements of larger geographically dispersed systems (state, regional and county systems)

P25 Interoperability Solution

- An essential tool for P25 migration

Benefits to Public Safety

- Provides comprehensive reports indicating alignment characteristics by radio ID, identifying their status as Failed, Passed or Never Received
- Detect radio issues before it becomes an emergency – mitigates possible legal liability
- A proactive radio maintenance tool that assures operational readiness

Visit LocusUSA at Booth 731 to learn more
https://www.locususa.com/products/diagnostx/
www.etherstack.com
Etherstack P25 Off-Air Monitor

Log Items Pane
A summary of all messages captured is listed. The source column indicates the channel in which the message originated. The summary column gives a brief overview of the message including any salient field values.

Marker Information
Delta time information from the current log entry to marked entries is displayed here.

Bookmarks Pane
Historical logs can be loaded and examined, with information about the log session maintained.

Details Pane
Detailed view of a selected message with a descriptive breakdown of each field and its value in both decimal and hex.

PC Application for:
- Non-intrusive, Bi-directional P25 Channel Observation
- P25 Air Interface Testing
- P25 Interoperability Verification
- Real-time Maintenance and Diagnostics

Etherstack P25 Off-Air Monitor - Test Session

March 2019
Project 25 Technology Interest Group

www.etherstack.com
Etherstack P25 Off-Air Monitor

- A wideband receiver allows observation of up to 4 air interface links across an RF range from 1MHz up to 2GHz.
- Alternatively, can be used with Aeroflex 3920.
- Captured information is interpreted and displayed in real time on an easy to navigate user interface, and all logged traffic can also be dumped and saved for later analysis.
- Interoperability tested against equipment from all of the major radio manufacturers
**Etherstack P25 Off-Air Monitor**

- **Log Items Pane**: A summary of all captured messages is displayed. The source column indicates the channel in which the message originated. The summary column gives a brief overview of the message including any associated field values.

- **Marker Information**: Delta time information for the current log entry to marked entries is displayed here.

- **RawData**: Raw data associated with the selected message is displayed and the currently selected field in the message is shown in bold to indicate its location in the message.

- **Details Pane**: Detailed view of a selected message with a descriptive breakdown of each field and its value in both decimal and hex.

- **Analyzers Pane**: The channels to be monitored are displayed here. There is no logical limit to the number of channels that can be monitored.

- **Capture Devices Pane**: Configuration parameters of the capture devices are defined here.

- **Filters Pane**: Complex filters can be defined to restrict the messages logged and/or displayed. Filters can be used to color the messages in the Log Items pane to provide for visual indication of key messages or field values.

- **Triggers Pane**: Field values and other attributes can be used to enable and disable filters to optimize long duration logging scenarios.