

Project 25 Compliance Assessment Program  
 Summary Test Report  
 EF Johnson ATLAS VHF Repeater  
 STR-EFJ-14040401  
 April 4, 2014

Test Item Description	
<b>Manufacturer</b>	EF Johnson Technologies
<b>Manufacturer Contact</b>	John Oblak (507) 837-5116
<b>Product Name</b>	ATLAS VHF Repeater (136 MHz to 174 MHz)
<b>Installed Options</b>	Trunking Software
<b>Vocoder Identification</b>	Not Applicable – The repeater does not incorporate a vocoder

Test Description
P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.1.1 – Project 25 Phase 1 Common Air Interface Conventional Base Station/Repeater Performance
P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.1.2 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Performance
P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.3.2 – Project 25 Phase 1 Common Air Interface Trunked Base station/Repeater Interoperability

Test Information	
<b>P25 CAP Laboratory Code</b>	P25CAP081010 (EF Johnson Technologies)
<b>Date(s) of Test</b>	January 28, 2013
<b>Date of Issue</b>	February 4, 2013

Test Information	
<b>P25 CAP Laboratory Code</b>	P25CAP081010 (EF Johnson Technologies)
<b>Date(s) of Test</b>	May 6, 2013 to May 16, 2013
<b>Date of Issue</b>	May 20, 2013

Test Information	
<b>P25 CAP Laboratory Code</b>	P25CAP081010 (EF Johnson Technologies)
<b>Date(s) of Test</b>	March 28, 2014
<b>Date of Issue</b>	April 1, 2014

Test Information	
<b>P25 CAP Laboratory Code</b>	P25CAP081010 (EF Johnson Technologies)
<b>Date(s) of Test</b>	March 31, 2014
<b>Date of Issue</b>	April 1, 2014

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Test Information	
<b>P25 CAP Laboratory Code</b>	P25CAP081010 (EF Johnson Technologies)
<b>Date(s) of Test</b>	April 3, 2014
<b>Date of Issue</b>	April 4, 2014

Informative References	
Date	Title
March 2010	P25-CAB-CAI_TEST_REQ-March 2010

Other Devices Tested with ATLAS VHF Repeater		
Manufacturer	Product Name, Definition, and Unique ID	Installed Options
EF Johnson	Viking VP600 Series Portable	Firmware 8.2.12
Midland	STP-105B Portable Subscriber	Firmware 1.03.4646
Harris	P5400 Portable Subscriber	Firmware R02A26; DSP V18.2

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<b>P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.1.1 – Project 25 Phase 1 Common Air Interface Conventional Base Station/Repeater Performance</b>		<b>DTR-P25CAP081010-13052001</b>	
<b>Receiver Tests</b>			
<b>Test Case</b>	<b>Description</b>	<b>Requirement</b>	<b>Results</b>
2.1.4	Reference Sensitivity	≤ -116 dBm (Class A)	P
2.1.5	Faded Reference Sensitivity	≤ -108 dBm (Class A)	P
2.1.7	Adjacent Channel Rejection	≥ 60 dB (Class A)	P
2.1.8	Co-Channel Rejection	≤ 9 dB	P
2.1.9	Spurious Response Rejection	≥ 90 dB (Class A)	P
2.1.10	Intermodulation Rejection	≥ 70 dB (Class B)	P
2.1.11	Signal Displacement Bandwidth	≥ 1000 Hz	P
2.1.17	Late Entry Unsquelch Delay		
	No Talk Group or Encryption	≤ 125 ms	N1
	Talk Group Only	≤ 370 ms	N1
	Encryption Only	≤ 370 ms	N1
	Both Talk Group and Encryption	≤ 460 ms	N1
2.1.18	Receiver Throughput Delay	≤ 125 ms	N1

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<b>Transmitter Tests</b>			
<b>Test Case</b>	<b>Description</b>	<b>Requirement</b>	<b>Results</b>
2.2.8	Unwanted Emissions: Adjacent Channel Power Ratio	$\geq 67$ dB	P
2.2.14	Transmitter Throughput Delay	$\leq 125$ ms	N2
2.2.15	Frequency Deviation for C4FM High Level Signal Deviation	$2544 \text{ Hz} < f_{\text{dev}} \leq 3111 \text{ Hz}$	P
	Low Level Signal Deviation	$848 \text{ Hz} < f_{\text{dev}} \leq 1037 \text{ Hz}$	P
2.2.16	Modulation Fidelity	$\leq 5\%$ (Class A)	P
2.2.18	Transient Frequency Behavior Time Interval $t_1 = 5$ ms	$ \Delta f  \leq 12.5$ kHz	P
	Time Interval $t_2 = 20$ ms	$ \Delta f  \leq 6.25$ kHz	P
	Time Interval $t_3 = 5$ ms	$ \Delta f  \leq 12.5$ kHz	P

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<b>P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.1.2 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Performance</b>		<b>DTR-P25CAP081010-13052001</b>	
<b>Receiver Tests</b>			
<b>Test Case</b>	<b>Description</b>	<b>Requirement</b>	<b>Results</b>
2.1.4	Reference Sensitivity	≤ -116 dBm (Class A)	P
2.1.5	Faded Reference Sensitivity	≤ -108 dBm (Class A)	P
2.1.7	Adjacent Channel Rejection	≥ 60 dB (Class A)	P
2.1.8	Co-Channel Rejection	≤ 9 dB	P
2.1.9	Spurious Response Rejection	≥ 90 dB (Class A)	P
2.1.10	Intermodulation Rejection	≥ 70 dB (Class B)	P
2.1.11	Signal Displacement Bandwidth	≥ 1000 Hz	P

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<b>Transmitter Tests</b>			
<b>Test Case</b>	<b>Description</b>	<b>Requirement</b>	<b>Results</b>
2.2.8	Unwanted Emissions: Adjacent Channel Power Ratio	$\geq 67$ dB	P
2.2.14	Transmitter Throughput Delay	$\leq 125$ ms	N2
2.2.15	Frequency Deviation for C4FM High Level Signal Deviation	$2544 \text{ Hz} < f_{\text{dev}} \leq 3111 \text{ Hz}$	P
	Low Level Signal Deviation	$848 \text{ Hz} < f_{\text{dev}} \leq 1037 \text{ Hz}$	P
2.2.16	Modulation Fidelity	$\leq 5\%$ (Class A)	P
2.2.18	Transient Frequency Behavior Time Interval $t_1 = 5$ ms	$ \Delta f  \leq 12.5$ kHz	P
	Time Interval $t_2 = 20$ ms	$ \Delta f  \leq 6.25$ kHz	P
	Time Interval $t_3 = 5$ ms	$ \Delta f  \leq 12.5$ kHz	P

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<b>Trunking Infrastructure Tests</b>			
Test Case	Description	Requirement	Results
2.3.3	Trunking Voice Access Time	560 ms (Manufacturer Specified)	P
2.3.4	Time to Grant		
	Non-Simulcast 37.5 ms ISP	Single TSBK < 337.5 ms	P
		Double TSBK < 354.0 ms	N3
		Triple TSBK < 366.5 ms	N3
	Non-Simulcast 45 ms ISP	Single TSBK < 345.0 ms	P
		Double TSBK < 361.5 ms	N3
		Triple TSBK < 374.0 ms	N3
	Simulcast 37.5 ms ISP	Single TSBK < 487.5 ms	N3
		Double TSBK < 504.0 ms	N3
		Triple TSBK < 516.5 ms	N3
	Simulcast 45 ms ISP	Single TSBK < 495.0 ms	N3
		Double TSBK < 511.5 ms	N3
		Triple TSBK < 524.0 ms	N3

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<b>P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.3.2 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Interoperability</b>		DTR-P25CAP081010-14040101	DTR-P25CAP081010-14040102	DTR-P25CAP081010-13020401
<b>EF Johnson ATLAS Trunked Repeater</b>		Midland STP-105B	Harris P5400	EF Johnson Viking VP600
<b>Test Case</b>	<b>Description</b>			
<b>2.2.1</b>	<b>Full Registration</b>			
<b>2.2.1.4.1</b>	Test Case 1 - Valid Registration			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.1.4.2</b>	Test Case 2 – Denied or Refused Registration			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.1.4.3</b>	Test Case 3 - Unverified Registration			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.2</b>	<b>Group Voice Call</b>			
<b>2.2.2.4.1</b>	Test Case 1 – Group Call Granted			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.2.4.2</b>	Test Case 2 – Group Call Denied			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.2.4.3</b>	Test Case 3 – Group Call Request Queued			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3

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<b>EF Johnson ATLAS Trunked Repeater</b>		Midland STP-105B	Harris P5400	EF Johnson Viking VP600
<b>Test Case</b>	<b>Description</b>			
<b>2.2.3</b>	<b>Unit-to-Unit Voice Call</b>			
<b>2.2.3.4.1</b>	Test Case 1 – Unit-To-Unit Call With Target Availability Check			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.3.4.2</b>	Test Case 2 – Unit-To-Unit Call Target Availability Check Denied By Target			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.3.4.3</b>	Test Case 3 – Unit-To-Unit Call Queued With Target Availability Check – traffic channel assignment after target availability check			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.3.4.4</b>	Test Case 4 – Unit-To-Unit Call Queued With Target Availability Check – traffic channel assignment before target availability check			
	Home Operation	N/A 1	N/A 1	N/A 1
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3

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<b>EF Johnson ATLAS Trunked Repeater</b>		Midland STP-105B	Harris P5400	EF Johnson Viking VP600
<b>Test Case</b>	<b>Description</b>			
<b>2.2.3</b>	<b>Unit-to-Unit Voice Call</b>			
<b>2.2.3.4.5</b>	Test Case 5 – Unit-To-Unit Call Without Target Availability Check			
	Home Operation	N3	N3	N3
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.3.4.6</b>	Test Case 7 – Unit-To-Unit Call Queued Without Target Availability Check			
	Home Operation	N3	N3	N3
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.3.4.7</b>	Test Case 8 – Unit-To-Unit Call Denied			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N4
	Inter-WACN Operation	N3	N3	N4

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<b>EF Johnson ATLAS Trunked Repeater</b>		Midland STP-105B	Harris P5400	EF Johnson Viking VP600
<b>Test Case</b>	<b>Description</b>			
<b>2.2.4</b>	<b>Broadcast Voice Call</b>			
<b>2.2.4.4.1</b>	Test Case 1 – Broadcast Voice Call			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.5</b>	<b>Affiliation</b>			
<b>2.2.5.4.1</b>	Test Case 1 - Radio Permitted To Affiliate With New Group			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.5.4.2</b>	Test Case 2 - Radio Denied Affiliation To New Group			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.6</b>	<b>Announcement Group Call</b>			
<b>2.2.6.4.1</b>	Test Case 1 - Collection Of Talk Groups Receive Call			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.7</b>	<b>Emergency Alarm</b>			
<b>2.2.7.4.1</b>	Test Case 1 - Emergency Alarm			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3

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<b>EF Johnson ATLAS Trunked Repeater</b>		Midland STP-105B	Harris P5400	EF Johnson Viking VP600
<b>Test Case</b>	<b>Description</b>			
<b>2.2.8</b>	<b>Emergency Group Call</b>			
<b>2.2.8.4.1</b>	Test Case 1 - Emergency Call			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.10</b>	<b>Encryption</b>			
<b>2.2.10.4.1</b>	Test Case 1 - Call Privacy For Encrypted Call			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
<b>2.2.11</b>	<b>Intra-Location Registration Area Roaming</b>			
<b>2.2.11.4.1</b>	Test Case 1 – Idle Radio			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3

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<b>Model Class Definition</b>	<b>Applied to P25-CAB-CAI_Test_Req March 2010, 2.2.3.2</b>	
<b>Model Class Name</b>	<b>Product Name, Definition, and Unique ID</b>	<b>Installed Options</b>
ATLAS VHF Repeater	ATLAS Trunked Repeater	<b>Firmware:</b> TSNI 1.0.5-1
		<b>Firmware:</b> TSNI 1.2.0-14

<b>Test Case Result Definitions</b>	
<b>No Test Performed</b>	---
<b>Test Does Not Apply to the Test Object</b>	N/A
<b>Test Object Meets Requirements</b>	P (Pass)
<b>Test Object Does Not Meet Requirements</b>	F (Fail)
<b>Test Object is Not Conclusive</b>	I (Inconclusive)

<b>Comments</b>
N/A 1: Test cases 2.2.3.4.4 is not applicable for this base station/repeater; see results of test 2.2.3.4.3
N1: The receiver does not incorporate a vocoder.
N2: The transmitter does not incorporate a vocoder.
N3: The EF Johnson ATLAS TSNI infrastructure does not support this feature.

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**OMB NO:** 1640-0015

**EXPIRATION DATE:** 07/31/2015

**Burden Statement**

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DHS FORM 10056 – June 2009