

Project 25 Compliance Assessment Program
 Summary Test Report
 EF Johnson ATLAS 4500 UHF Repeater
 STR-EFJ-15122101
 December 21, 2015

Test Item Description	
Manufacturer	EF Johnson Technologies
Manufacturer Contact	John Oblak (507) 382-6327
Product Name	ATLAS UHF 4500 Repeater (380 MHz to 512 MHz)
Installed Options	Trunking Software
Vocoder Identification	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	
P25 CAP Laboratory Code	P25CAP081010 (EF Johnson Technologies)
Date(s) of Test	November 18, 2015 to November 30, 2015
Date of Issue	December 3, 2015

Test Information	
P25 CAP Laboratory Code	P25CAP081010 (EF Johnson Technologies)
Date(s) of Test	December 15, 2015
Date of Issue	December 21, 2015

Test Information	
P25 CAP Laboratory Code	P25CAP081010 (EF Johnson Technologies)
Date(s) of Test	December 15, 2015 to December 17, 2015
Date of Issue	December 21, 2015

Test Information	
P25 CAP Laboratory Code	P25CAP081010 (EF Johnson Technologies)
Date(s) of Test	December 15, 2015 to December 17, 2015
Date of Issue	December 21, 2015

Project 25 Compliance Assessment Program
Summary Test Report
EF Johnson ATLAS 4500 UHF Repeater
STR-EFJ-15122101
December 21, 2015

Test Information	
P25 CAP Laboratory Code	P25CAP081010 (EF Johnson Technologies)
Date(s) of Test	December 15, 2015 to December 17, 2015
Date of Issue	December 21, 2015

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

Other Devices Tested with ATLAS UHF Repeater		
Manufacturer	Product Name, Definition, and Unique ID	Installed Options
EF Johnson	Viking VP900 Series Portable	SEM Encryption Module
Kenwood	NX-5400-K3 Series Portable	Encryption Installed
Motorola	XTS 5000 Series Portable	Encryption Installed

Project 25 Compliance Assessment Program
 Summary Test Report
 EF Johnson ATLAS 4500 UHF Repeater
 STR-EFJ-15122101
 December 21, 2015

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.1.1 – Project 25 Phase 1 Common Air Interface Conventional Base Station/Repeater Performance		DTR-P25CAP081010-15120301	
Receiver Tests			
Test Case	Description	Requirement	Results
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	≥ 80 dB (Class A)	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

Project 25 Compliance Assessment Program
 Summary Test Report
 EF Johnson ATLAS 4500 UHF Repeater
 STR-EFJ-15122101
 December 21, 2015

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.1.1 – Project 25 Phase 1 Common Air Interface Conventional Base Station/Repeater Performance		DTR-P25CAP081010-15120301	
Transmitter Tests			
Test Case	Description	Requirement	Results
2.2.8	Unwanted Emissions: Adjacent Channel Power Ratio	≥ 67 dB	P
2.2.14	Transmitter Throughput Delay	≤ 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 $t_1 = 10$ ms	$ \Delta f \leq 12.5$ kHz	P
	Time Interval $t_2 = 25$ ms	$ \Delta f \leq 6.25$ kHz	P
	Time Interval $t_3 = 10$ ms	$ \Delta f \leq 12.5$ kHz	P

Project 25 Compliance Assessment Program
 Summary Test Report
 EF Johnson ATLAS 4500 UHF Repeater
 STR-EFJ-15122101
 December 21, 2015

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.1.2 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Performance		DTR-P25CAP081010-15120301 DTR-P25CAP081010-15122101	
Receiver Tests			
Test Case	Description	Requirement	Results
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	≥ 80 dB (Class A)	P
2.1.11	Signal Displacement Bandwidth	≥ 1000 Hz	P

Project 25 Compliance Assessment Program
 Summary Test Report
 EF Johnson ATLAS 4500 UHF Repeater
 STR-EFJ-15122101
 December 21, 2015

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.1.2 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Performance		DTR-P25CAP081010-15120301 DTR-P25CAP081010-15122101	
Transmitter Tests			
Test Case	Description	Requirement	Results
2.2.8	Unwanted Emissions: Adjacent Channel Power Ratio	≥ 67 dB	P
2.2.14	Transmitter Throughput Delay	≤ 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 $t_1 = 10$ ms	$ \Delta f \leq 12.5$ kHz	P
	Time Interval $t_2 = 25$ ms	$ \Delta f \leq 6.25$ kHz	P
	Time Interval $t_3 = 10$ ms	$ \Delta f \leq 12.5$ kHz	P

Project 25 Compliance Assessment Program
 Summary Test Report
 EF Johnson ATLAS 4500 UHF Repeater
 STR-EFJ-15122101
 December 21, 2015

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.1.2 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Performance		DTR-P25CAP081010-15120301 DTR-P25CAP081010-15122101	
Trunking Infrastructure Tests			
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	N4
		Double TSBK < 354.0 ms	N4
		Triple TSBK < 366.5 ms	P
	Non-Simulcast 45 ms ISP	Single TSBK < 345.0 ms	N4
		Double TSBK < 361.5 ms	N4
		Triple TSBK < 374.0 ms	P
	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

Project 25 Compliance Assessment Program
 Summary Test Report
 EF Johnson ATLAS 4500 UHF Repeater
 STR-EFJ-15122101
 December 21, 2015

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.3.2 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Interoperability		DTR-P25CAP081010-15122102	DTR-P25CAP081010-15122103	DTR-P25CAP081010-15122104
EF Johnson ATLAS 4500 Trunked Repeater		EF Johnson Viking VP900 Portable	Kenwood NX-5400 Portable	Motorola XTS 5000
Test Case	Description			
2.2.1	Full Registration			
2.2.1.4.1	Test Case 1 - Valid Registration			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
2.2.1.4.2	Test Case 2 – Denied or Refused Registration			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
2.2.1.4.3	Test Case 3 - Unverified Registration			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
2.2.2	Group Voice Call			
2.2.2.4.1	Test Case 1 – Group Call Granted			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
2.2.2.4.2	Test Case 2 – Group Call Denied			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
2.2.2.4.3	Test Case 3 – Group Call Request Queued			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3

Project 25 Compliance Assessment Program
 Summary Test Report
 EF Johnson ATLAS 4500 UHF Repeater
 STR-EFJ-15122101
 December 21, 2015

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.3.2 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Interoperability		DTR-P25CAP081010-14040101	DTR-P25CAP081010-14040102	DTR-P25CAP081010-13020401
EF Johnson ATLAS 4500 Trunked Repeater		EF Johnson Viking VP900 Portable	Kenwood NX-5400 Portable	Motorola XTS 5000
Test Case	Description			
2.2.3	Unit-to-Unit Voice Call			
2.2.3.4.1	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
2.2.3.4.2	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
2.2.3.4.3	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
2.2.3.4.4	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

Project 25 Compliance Assessment Program
 Summary Test Report
 EF Johnson ATLAS 4500 UHF Repeater
 STR-EFJ-15122101
 December 21, 2015

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.3.2 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Interoperability		DTR-P25CAP081010-14040101	DTR-P25CAP081010-14040102	DTR-P25CAP081010-13020401
EF Johnson ATLAS 4500 Trunked Repeater		EF Johnson Viking VP900 Portable	Kenwood NX-5400 Portable	Motorola XTS 5000
Test Case	Description			
2.2.3	Unit-to-Unit Voice Call			
2.2.3.4.5	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
2.2.3.4.6	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
2.2.3.4.7	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

Project 25 Compliance Assessment Program
 Summary Test Report
 EF Johnson ATLAS 4500 UHF Repeater
 STR-EFJ-15122101
 December 21, 2015

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.3.2 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Interoperability		DTR-P25CAP081010-14040101	DTR-P25CAP081010-14040102	DTR-P25CAP081010-13020401
EF Johnson ATLAS 4500 Trunked Repeater		EF Johnson Viking VP900 Portable	Kenwood NX-5400 Portable	Motorola XTS 5000
Test Case	Description			
2.2.4	Broadcast Voice Call			
2.2.4.4.1	Test Case 1 – Broadcast Voice Call			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
2.2.5	Affiliation			
2.2.5.4.1	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
2.2.5.4.2	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
2.2.6	Announcement Group Call			
2.2.6.4.1	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
2.2.7	Emergency Alarm			
2.2.7.4.1	Test Case 1 - Emergency Alarm			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3

Project 25 Compliance Assessment Program
 Summary Test Report
 EF Johnson ATLAS 4500 UHF Repeater
 STR-EFJ-15122101
 December 21, 2015

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.2.3.2 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Interoperability		DTR-P25CAP081010-14040101	DTR-P25CAP081010-14040102	DTR-P25CAP081010-13020401
EF Johnson ATLAS 4500 Trunked Repeater		EF Johnson Viking VP900 Portable	Kenwood NX-5400 Portable	Motorola XTS 5000
Test Case	Description			
2.2.8	Emergency Group Call			
2.2.8.4.1	Test Case 1 - Emergency Call			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3
2.2.10	Encryption			
2.2.10.4.1	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
2.2.11	Intra-Location Registration Area Roaming			
2.2.11.4.1	Test Case 1 – Idle Radio			
	Home Operation	P	P	P
	Inter-System Operation	N3	N3	N3
	Inter-WACN Operation	N3	N3	N3

Project 25 Compliance Assessment Program
 Summary Test Report
 EF Johnson ATLAS 4500 UHF Repeater
 STR-EFJ-15122101
 December 21, 2015

Model Class Definition	Applied to P25-CAB-CAI_Test_Req March 2010, 2.2.3.2	
Model Class Name	Product Name, Definition, and Unique ID	Installed Options
ATLAS 4500 UHF Repeater	ATLAS 4500 Trunked Repeater	Firmware: 1.0.1_27
		DSP: 107000000174

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

Comments
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.
N4: The Johnson Atlas 4500 Repeater uses a multi-block message for explicit channel assignments in UHF bands.

Project 25 Compliance Assessment Program
Summary Test Report
EF Johnson ATLAS 4500 UHF Repeater
STR-EFJ-15122101
December 21, 2015

The information contained herein has been provided by the manufacturer of the product with permission to make the information publicly available. The Department of Homeland Security (DHS) is making this information available as a public service; however, DHS IS PROVIDING THE INFORMATION "AS IS". DHS MAKES NO EXPRESS OR IMPLIED WARRANTIES AND SPECIFICALLY, DHS MAKES NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, REGARDING THE ACCURACY OR USE OF THIS INFORMATION. Reference to any specific commercial products, processes, or services by trade name, trademark, manufacturer, or otherwise does not constitute an endorsement by or recommendation from DHS.

OMB NO: 1640-0015

EXPIRATION DATE: 07/31/2015

Burden Statement

An agency may not consider or sponsor information collection and a person is not required to respond to this information collection unless it displays a current valid Office of Management and Budget control number and expiration date. The control number for this collection is 1640-0015 and this form will expire on 07/31/2015. The estimated average time to complete this form is 60 minutes per respondent. If you have any comments regarding the burden estimate you can write to Department of Homeland Security, Science and Technology Directorate, Washington, DC 20528.

DHS FORM 10056 – June 2009