

**Project 25 Compliance Assessment Program**  
**Summary Test Report**  
**NX-5400 Portable Radio, 700 / 800 MHz**  
**STR-JKWRD-NX5400-1214C**

<b>Device Under Test Description</b>	
<b>Manufacturer</b>	JVCKENWOOD Corporation JVCKENWOOD USA Corporation
<b>Manufacturer Contact</b>	Donald E. Wingo, 678-474-4719
<b>Product Name</b>	NX-5400
<b>Frequency Band</b>	700 / 800 MHz
<b>Installed Options</b>	P25 Conventional P25 Trunking P25 DES (multi-keys) encryption P25 AES (multi-keys) encryption
<b>Installed Vocoder</b>	Enhanced Full Rate

<b>Test Description</b>
P25-CAB-CAI_TEST_REQ - March 2010, Section 2.1.1.1 - Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Performance
P25-CAB-CAI_TEST_REQ - March 2010, Section 2.1.1.2 - Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance
P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.3.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Interoperability.

<b>Laboratory Information</b>	
<b>P25 CAP Laboratory Number</b>	P25CAP081010 (EFJohnson Technologies)
<b>Date(s) of Test</b>	28 July to 04 August 2014
<b>Date of Issue</b>	25 August 2014
<b>P25 CAP Laboratory Number</b>	P25CAP081010 (EFJohnson Technologies)
<b>Date(s) of Test</b>	7 August 2014
<b>Date of Issue</b>	20 August 2014
<b>P25 CAP Laboratory Number</b>	P25CAP081017 (Harris Corporation)
<b>Date(s) of Test</b>	06 November 2014
<b>Date of Issue</b>	10 November 2014
<b>P25 CAP Laboratory Number</b>	P25CAP081011 (Compliance Testing, LLC)
<b>Date(s) of Test</b>	27 May 2015
<b>Date of Issue</b>	02 June 2015

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Informative References	
Date	Title
March 2010	P25-CAB-CAI_TEST_REQ

**Other Devices Tested with: JVCKENWOOD NX-5xxx (Model Class\*)**

Manufacturer	Product Name, Definition, and Unique ID	Installed Options
EFJohnson	ATLAS, P25 Trunking System	Rel 1..1.0-10, TSNI 1.2.0-14
Harris Corp.	VIDA Premier SR10A MASTR V	Firmware R7G13
Codan Radio	Codan MT-4E – Daniels Trunked Radio	V1.1.0.9

*\*JVCKENWOOD Model Class is defined as all subscriber units, mobile and portable, that use common software / firmware and hardware design as related to interoperability testing.*

**Performance Test Cases and Results**

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.1 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Performance		DTR-P25CAP081010-14082501	
Performance – Conventional Receiver Tests NX-5400 (700/800 MHz)			
Test Case	Description	Requirement	Results
2.1.4	Reference Sensitivity	$\leq -116$ dBm	P1
2.1.5	Faded Reference Sensitivity	$\leq -108$ dBm	P2
2.1.6	Signal Delay Spread Capability	$\geq 50$ us	P3
2.1.7	Adjacent Channel Rejection	$\geq 60$ dB	P4
2.1.8	Co-Channel Rejection	$\leq 9$ dB	P
2.1.9	Spurious Response Rejection	$\geq 70$ dB	P
2.1.10	Intermodulation Rejection	$\geq 70$ dB	P
2.1.11	Signal Displacement Bandwidth	$\geq 1000$ Hz	P
2.1.17	Late Entry Unsquelch Delay		
	No Talk Group or Encryption	$\leq 125$ ms	P
	Talk Group Only	$\leq 370$ ms	P
	Encryption Only	$\leq 370$ ms	P
	Both (On Clear or Encrypted Channel)	$\leq 460$ ms	P
2.1.18	Receiver Throughput Delay	$\leq 125$ ms	P

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<b>P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.1 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Performance</b>		<b>DTR-P25CAP081010-14082501</b>	
<b>Performance – Conventional Transmitter Tests NX-5400 (700 MHz)</b>			
<b>Test Case</b>	<b>Description</b>	<b>Requirement</b>	<b>Results</b>
2.2.8	Adjacent Channel Power Ratio – Offset from Center Freq (kHz) –	ACPR (dB)	
	<u>700 MHz Band</u>		
	9.375	40	P
	15.625, 21.875, 37.5	60	P
	62.5, 87.5, 150, 250, 350	65	P
	>400 kHz to 12 MHz	75	P
	12 MHz to paired RX Band	75	P
	In the Paired RX Band	100	P
2.2.12	Transmitter Power Attack Time	$\leq 50$ ms	P
	Encoder Attack Time	$\leq 100$ ms	P
2.2.14	Transmitter Throughput Delay	$\leq 125$ ms	P
2.2.15	Frequency Deviation for C4FM		
	High Level Signal Deviation	$2544 \leq f_{dev} \leq 3111$ Hz	P
	Low Level Signal Deviation	$848 \leq f_{dev} \leq 1037$ Hz	P
2.2.16	Modulation Fidelity	$\leq 5\%$	P
2.2.18	Transient Frequency Behavior		
	Time Interval $t^1 = 20$ ms	$\{\Delta f\} \leq 12.5$ kHz	P
	Time Interval $t^2 = 50$ ms	$\{\Delta f\} \leq 6.25$ kHz	P
	Time Interval $t^3 = 10$ ms	$\{\Delta f\} \leq 12.5$ kHz	P

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<b>P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.1 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Performance</b>		<b>DTR-P25CAP081010-14082501</b>	
<b>Performance – Conventional Transmitter Tests NX-5400 (800 MHz)</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
2.2.12	Transmitter Power Attack Time	$\leq 50$ ms	P
		Encoder Attack Time	$\leq 100$ ms
2.2.14	Transmitter Throughput Delay	$\leq 125$ ms	P
2.2.15	Frequency Deviation for C4FM High Level Signal Deviation Low Level Signal Deviation	$2544 \leq f_{dev} \leq 3111$ Hz	P
		$848 \leq f_{dev} \leq 1037$ Hz	P
2.2.16	Modulation Fidelity	$\leq 5\%$	P
2.2.18	Transient Frequency Behavior Time Interval $t^1 = 20$ ms Time Interval $t^2 = 50$ ms Time Interval $t^3 = 10$ ms	$\{\Delta f\} \leq 12.5$ kHz	P
		$\{\Delta f\} \leq 6.25$ kHz	P
		$\{\Delta f\} \leq 12.5$ kHz	P

<b>P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance</b>		<b>DTR-P25CAP081010-14082502</b>	
<b>Performance – Trunked Receiver Tests NX-5400 (700/800 MHz)</b>			
<b>Test Case</b>	<b>Description</b>	<b>Requirement</b>	<b>Results</b>
2.1.4	Reference Sensitivity	$\leq -116$ dBm	P1
2.1.5	Faded Reference Sensitivity	$\leq -108$ dBm	P2
2.1.6	Signal Delay Spread Capability	$\geq 50$ us	P3
2.1.7	Adjacent Channel Rejection	$\geq 60$ dB	P4
2.1.8	Co-Channel Rejection	$\leq 9$ dB	P
2.1.9	Spurious Response Rejection	$\geq 70$ dB	P
2.1.10	Intermodulation Rejection	$\geq 70$ dB	P
2.1.11	Signal Displacement Bandwidth	$\geq 1000$ Hz	P

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<b>P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance</b>		<b>DTR-P25CAP081010-14082502</b>	
<b>Performance – Trunked Transmitter Tests NX-5400 (700 MHz)</b>			
<b>Test Case</b>	<b>Description</b>	<b>Requirement</b>	<b>Results</b>
2.2.8	Adjacent Channel Power Ratio – Offset from Center Freq (kHz)	ACPR (dB)	
	<u>700 MHz Band</u>		
	9.375	40	P
	15.625, 21.875, 37.5	60	P
	62.5, 87.5, 150, 250, 350	65	P
	>400 kHz to 12 MHz	75	P
	12 MHz to paired RX Band	75	P
	In the Paired RX Band	100	P
2.2.12	Transmitter Power Attack Time	$\leq 50$ ms	P
	Encoder Attach Time	$\leq 100$ ms	P
2.2.14	Transmitter Throughput Delay	$\leq 125$ ms	P
2.2.15	Frequency Deviation for C4FM		
	High Level Signal Deviation	$2544 \leq f_{dev} \leq 3111$ Hz	P
	Low Level Signal Deviation	$848 \leq f_{dev} \leq 1037$ Hz	P
2.2.16	Modulation Fidelity	$\leq 5\%$	P
2.2.18	Transient Frequency Behavior		
	Time Interval $t^1 = 20$ ms	$\{\Delta f\} \leq 12.5$ kHz	P
	Time Interval $t^2 = 50$ ms	$\{\Delta f\} \leq 6.25$ kHz	P
	Time Interval $t^3 = 10$ ms	$\{\Delta f\} \leq 12.5$ kHz	P

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<b>P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance</b>		<b>DTR-P25CAP081010-14082502</b>	
<b>Performance – Trunked Transmitter Tests NX-5400 (800 MHz)</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
2.2.12	Transmitter Power Attack Time	$\leq 50$ ms	P
		Encoder Attach Time	$\leq 100$ ms
2.2.14	Transmitter Throughput Delay	$\leq 125$ ms	P
2.2.15	Frequency Deviation for C4FM		
	High Level Signal Deviation	$2544 \leq f_{dev} \leq 3111$ Hz	P
	Low Level Signal Deviation	$848 \leq f_{dev} \leq 1037$ Hz	P
2.2.16	Modulation Fidelity	$\leq 5\%$	P
2.2.18	Transient Frequency Behavior		
	Time Interval $t^1 = 20$ ms	$\{\Delta f\} \leq 12.5$ kHz	P
	Time Interval $t^2 = 50$ ms	$\{\Delta f\} \leq 6.25$ kHz	P
	Time Interval $t^3 = 10$ ms	$\{\Delta f\} \leq 12.5$ kHz	P

<b>P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance</b>		<b>DTR-P25CAP081010-14082502</b>	
<b>Performance – Trunked Transmitter Tests NX-5400 (700/800 MHz)</b>			
<b>Test Case</b>	<b>Description</b>	<b>Requirement</b>	<b>Results</b>
2.3.1	Trunking Control Channel Slot Time		
	45 ms Slot		
	Encode Attack Time	$2.0 \text{ ms} \leq t \leq 11.65 \text{ ms}$	P
	RF Power Attack Time	$0.0 \text{ ms} \leq t \leq 11.65 \text{ ms}$	P
	RF Turn Off Time	$\leq 1.57$ ms	P
2.3.2	Trunking Request Time (45 ms Slot)	$\leq 167$ ms	P
2.3.3	Trunking Voice Access Time	$< 500$ ms	P5
2.3.5	Transmit Time to Key on Traffic Channel	$\leq 150$ ms	P

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**Interoperability Test Cases and Results**

<b>P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.3.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Interoperability</b>		<b>DTR-P25CAP08101 0-14082001</b>	<b>DTR-P25CAP0810 17-1141104K</b>	<b>DTR-P25CAP0810 11</b>
<b>Kenwood Model Class – NX-5000</b>		<b>EFJ ATLAS</b>	<b>HARRIS VIDA</b>	<b>CODAN</b>
<b>Test Case</b>	<b>Description</b>	<b>Result</b>		
<b>2.2.1</b>	<b>Full Registration</b>			
<b>2.2.1.4.1</b>	Test Case 1 – Valid Registration			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
	Inter-WACN Roaming Configuration	N1	N3	N4
<b>2.2.1.4.2</b>	Test Case 2 – Denied or Refused Registration			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
	Inter-WACN Roaming Configuration	N1	N3	N4
<b>2.2.1.4.3</b>	Test Case 3 – Unverified Registration			
	Home Configuration	P	P	N5
	Inter-System Roaming Configuration	N1	N3	N4
	Inter-WACN Roaming Configuration	N1	N3	N4
<b>2.2.2</b>	<b>Group Voice Call</b>			
<b>2.2.2.4.1</b>	Test Case 1 – Group Call Granted			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
	Inter-WACN Roaming Configuration	N1	N3	N4
<b>2.2.2.4.2</b>	Test Case 2 – Group Call Denied			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
	Inter-WACN Roaming Configuration	N1	N3	N4
<b>2.2.2.4.3</b>	Test Case 3 – Group Call Request Queued			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
	Inter-WACN Roaming Configuration	N1	N3	N4

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<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 Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
<b>2.2.3.4.2</b>	Test Case 2 – Unit-to-Unit Call with Target Availability Check Denied by Target			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
<b>2.2.3.4.3</b>	Test Case 3 – Unit-to-Unit Call with Target Availability Check – Traffic Assignment After Target Availability Check			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
<b>2.2.3.4.4</b>	Test Case 4 – Unit-to-Unit Call with Target Availability Check – Traffic Assignment Before Target Availability Check			
	Home Configuration	NA1	NA1	NA1
	Inter-System Roaming Configuration	N1	N3	N4
<b>2.2.3.4.5</b>	Test Case 5 – Unit-to-Unit Call without Target Availability Check			
	Home Configuration	N2	P	N2
	Inter-System Roaming Configuration	N1	N3	N4
<b>2.2.3.4.6</b>	Test Case 6 – Unit-to-Unit Call Queued without Target Availability Check			
	Home Configuration	N2	P	N2
	Inter-System Roaming Configuration	N1	N3	N4
<b>2.2.3.4.7</b>	Test Case 7 – Unit-to-Unit Call Denied			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4



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<b>2.2.4</b>	<b>Broadcast Voice Call</b>			
<b>2.2.4.4.1</b>	Test Case 1 – Broadcast Voice Call			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
	Inter-WACN Roaming Configuration	N1	N3	N4
<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 Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
	Inter-WACN Roaming Configuration	N1	N3	N4
<b>2.2.5.4.2</b>	Test Case 2 – Radio Denied Affiliation to New Group			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
	Inter-WACN Roaming Configuration	N1	N3	N4
<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 Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
	Inter-WACN Roaming Configuration	N1	N3	N4
<b>2.2.7</b>	<b>Emergency Alarm</b>			
<b>2.2.7.4.1</b>	Test Case 1 – Emergency Alarm			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
	Inter-WACN Roaming Configuration	N1	N3	N4
<b>2.2.8</b>	<b>Emergency Group Call</b>			
<b>2.2.8.4.1</b>	Test Case 1 – Emergency Call			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
	Inter-WACN Roaming Configuration	N1	N3	N4
<b>2.2.10</b>	<b>Encryption</b>			
<b>2.2.10.4.1</b>	Test Case 1 – Call Privacy for Encrypted Call			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N1	N3	N4
	Inter-WACN Roaming Configuration	N1	N3	N4
<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 Configuration	P	P	N6
	Inter-System Roaming Configuration	N1	N3	N4
	Inter-WACN Roaming Configuration	N1	N3	N4

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<b>Model Class: NX-5000 Subscriber</b>	
<b>Product Name, Definitions and Unique ID</b>	<b>Model Number and Installed Options</b>
NX-5400 700/800 Portable	FW K1.11.01; Trunking, Encryption

<b>Test Case Results Definitions</b>	
No Test Performed	NT
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)
<b>Comments</b>	
P1: Kenwood subscriber passes Reference Sensitivity specification for C4FM and Simulcast modulations.	
P2: Kenwood subscriber passes Faded Reference Sensitivity specification for C4FM and Simulcast modulations.	
P3: Kenwood subscriber passes Signal Delay Spread Capability specification for C4FM ( $\geq 50$ us) and Simulcast ( $\geq 80$ us) modulations.	
P4: Kenwood subscriber passes Adjacent Channel Rejection specification for C4FM and Simulcast modulations.	
P5: Trunking Voice Access Time will vary dependent on actual system design and implementation.	
N1: EFJohnson infrastructure does not support Inter-System or Inter-WACN roaming.	
N2: Test Cases 2.2.3.4.5 and 2.2.3.4.6 are not supported by EFJohnson and Codan FNE.	
N3: Harris infrastructure does not support Inter-System or Inter-WACN roaming	
N4: Codan infrastructure does not support Inter-System or Inter-WACN roaming	
N5: Codan infrastructure does not support Test Case 3, Section 2.2.1.4.3 Unverified Registration	
N6: Codan infrastructure does not support Intra-Location Registration Area Roaming, Test Case 1, Section 2.2.11.4.1.	
NA1: Test Case 2, Section 2.2.3.4.4 is not applicable to JVCKENWOOD subscribers on EFJ, Harris and Codan infrastructures; see results of test case 2.2.3.4.3	

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**OMB NO:** 1640-0015

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

**Burden Statement**

An agency may not conduct 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 an 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 10044 – June 2009