

Project 25 Compliance Assessment Program  
 Summary Test Report  
 EF Johnson TK 5330 UHF Portable Subscriber Unit  
 STR-EFJ-15082801  
 August 28, 2015

Test Item Description	
<b>Manufacturer</b>	EF Johnson Technologies
<b>Manufacturer Contact</b>	John Oblak (507) 382-6327
<b>Product Name</b>	TK 5330 UHF Portable Subscriber Unit (380 MHz to 520 MHz)
<b>Installed Options</b>	P25 Conventional P25 Trunking DES Encryption AES Encryption
<b>Vocoder Identification</b>	Enhanced Full Rate

Test Description	
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	

Test Information	
<b>P25 CAP Laboratory Code</b>	P25CAP081010 (EF Johnson Technologies)
<b>Date(s) of Test</b>	November 6, 2014 to November 14, 2014
<b>Date of Issue</b>	December 5, 2014

Test Information	
<b>P25 CAP Laboratory Code</b>	P25CAP081010 (EF Johnson Technologies)
<b>Date(s) of Test</b>	November 12, 2014 to November 20, 2015
<b>Date of Issue</b>	December 3, 2014

Test Information	
<b>P25 CAP Laboratory Code</b>	P25CAP081010 (EF Johnson Technologies)
<b>Date(s) of Test</b>	August 7, 2014
<b>Date of Issue</b>	August 20, 2014

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Test Information	
<b>P25 CAP Laboratory Code</b>	P25CAP081017 (Harris Corporation)
<b>Date(s) of Test</b>	November 6, 2014
<b>Date of Issue</b>	November 10, 2014

Test Information	
<b>P25 CAP Laboratory Code</b>	P25CAP081011 (Compliance Testing, LLC)
<b>Date(s) of Test</b>	May 27, 2015
<b>Date of Issue</b>	June 2, 2015

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

Other Devices Tested with TK 5330 Portable Subscriber Unit		
Manufacturer	Product Name, Definition, and Unique ID	Installed Options
EF Johnson	ATLAS Trunked Infrastructure	Release 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

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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-P25CAP081010-14120501</b>	
<b>Receiver Tests</b>			
<b>Test Case</b>	<b>Description</b>	<b>Requirement</b>	<b>Results</b>
2.1.4	Reference Sensitivity	$\leq -116$ dBm (Class A)	P1
2.1.5	Faded Reference Sensitivity	$\leq -108$ dBm (Class A)	P2
2.1.6	Signal Delay Spread Capability	$\geq 50$ $\mu$ s	P3
2.1.7	Adjacent Channel Rejection	$\geq 60$ dB (Class A)	P4
2.1.8	Co-Channel Rejection	$\leq 9$ dB	P
2.1.9	Spurious Response Rejection	$\geq 70$ dB (Class A)	P
2.1.10	Intermodulation Rejection	$\geq 70$ dB (Class A)	P
2.1.11	Signal Displacement Bandwidth	$\geq 1000$ Hz	P
2.1.17	Late Entry Unsquench Delay		
	No Talk Group or Encryption	$\leq 125$ ms	P
	Talk Group Only	$\leq 370$ ms	P
	Encryption Only	$\leq 370$ ms	P
	Both Talk Group and Encryption	$\leq 460$ ms	P
2.1.18	Receiver Throughput Delay	$\leq 125$ ms	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
2.2.12	Transmitter Power and Encoder Attack Time		
	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	$2544 \text{ Hz} < f_{\text{dev}} \leq 3111 \text{ Hz}$	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

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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-P25CAP081010-14120501 DTR-P25CAP081010-14120301</b>	
<b>Receiver Tests</b>			
<b>Test Case</b>	<b>Description</b>	<b>Requirement</b>	<b>Results</b>
2.1.4	Reference Sensitivity	$\leq -116$ dBm (Class A)	P1
2.1.5	Faded Reference Sensitivity	$\leq -108$ dBm (Class A)	P2
2.1.6	Signal Delay Spread Capability	$\geq 50$ $\mu$ s	P3
2.1.7	Adjacent Channel Rejection	$\geq 60$ dB (Class A)	P4
2.1.8	Co-Channel Rejection	$\leq 9$ dB	P
2.1.9	Spurious Response Rejection	$\geq 70$ dB (Class A)	P
2.1.10	Intermodulation Rejection	$\geq 70$ dB (Class A)	P
2.1.11	Signal Displacement Bandwidth	$\geq 1000$ 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
2.2.12	Transmitter Power and Encoder Attack Time		
	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	$2544 \text{ Hz} < f_{\text{dev}} \leq 3111 \text{ Hz}$	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

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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-P25CAP081010-14120501 DTR-P25CAP081010-14120301</b>	
<b>Trunked Subscriber Unit Tests</b>			
Test Case	Description	Requirement	Results
2.3.1	Trunking Control Channel Slot Times (45 ms slot) - N7 Encode Attack Time RF Power Attack Time RF Power Turn Off Time	2.00 ms ≤ t ≤ 11.65 ms 0 ms ≤ t ≤ 11.65 ms ≤ 1.57 ms	P P P
2.3.2	Trunking Request Time	≤ 167.5 ms	P
2.3.3	Trunking Voice Access Time	500 ms (Manufacturer Specified)	P
2.3.5	Transmitter Time to Key on a Traffic Channel Short Channel Form	≤ 150.0 ms	P

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<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>		DTR- P25CAP081010- 14082001	DTR- P25CAP081017- 1141104K	DTR- P25CAP081011
<b>EF Johnson TK 5330 Portable</b>		EF Johnson IP25 Trunking Infrastructure	Harris VIDA Trunked Infrastructure	Codan
<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	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4
<b>2.2.1.4.2</b>	Test Case 2 – Denied or Refused			
	Home Operation	P	P	P
	Inter-System Operation	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4
<b>2.2.1.4.3</b>	Test Case 3 - Unverified Registration			
	Home Operation	P	P	N5
	Inter-System Operation	N1	N3	N4
	Inter-WACN Operation	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 Operation	P	P	P
	Inter-System Operation	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4
<b>2.2.2.4.2</b>	Test Case 2 – Group Call Denied			
	Home Operation	P	P	P
	Inter-System Operation	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4
<b>2.2.2.4.3</b>	Test Case 3 – Group Call Request			
	Home Operation	P	P	P
	Inter-System Operation	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4



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<b>EF Johnson TK 5330 Portable</b>		EF Johnson IP25 Trunking Infrastructure	Harris VIDA Trunked Infrastructure	Codan
<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	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4
<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	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4
<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	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4
<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	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4
<b>2.2.3.4.5</b>	Test Case 5 – Unit-To-Unit Call Without Target Availability Check			
	Home Operation	N2	P	N2
	Inter-System Operation	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4

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<b>EF Johnson TK 5330 Portable</b>		EF Johnson IP25 Trunking Infrastructure	Harris VIDA Trunked Infrastructure	Codan
<b>Test Case</b>	<b>Description</b>			
<b>2.2.3</b>	<b>Unit-To-Unit Voice Call</b>			
<b>2.2.3.4.6</b>	Test Case 6 – Unit-To-Unit Call Queued Without Target Availability Check			
	Home Operation	N2	P	N2
	Inter-System Operation	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4
<b>2.2.3.4.7</b>	Test Case 7 – Unit-To-Unit Call Denied			
	Home Operation	P	P	P
	Inter-System Operation	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4

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<b>EF Johnson TK 5330 Portable</b>		EF Johnson IP25 Trunking Infrastructure	Harris VIDA Trunked Infrastructure	Codan
<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	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4
<b>2.2.5</b>	<b>Affiliation</b>			
<b>2.2.5.4.1</b>	<i>Test Case 1 - Radio Permitted To Affiliate With New Group</i>			
	Home Operation	P	P	P
	Inter-System Operation	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4
<b>2.2.5.4.2</b>	<i>Test Case 2 - Radio Denied Affiliation To New Group</i>			
	Home Operation	P	P	P
	Inter-System Operation	N1	N3	N4
	Inter-WACN Operation	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 Operation	P	P	P
	Inter-System Operation	N1	N3	N4
	Inter-WACN Operation	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 Operation	P	P	P
	Inter-System Operation	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4

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<b>EF Johnson TK 5330 Portable</b>		EF Johnson IP25 Trunking Infrastructure	Harris VIDA Trunked Infrastructure	Codan
<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	N1	N3	N4
	Inter-WACN Operation	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 Operation	P	P	P
	Inter-System Operation	N1	N3	N4
	Inter-WACN Operation	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 Operation	P	P	N6
	Inter-System Operation	N1	N3	N4
	Inter-WACN Operation	N1	N3	N4

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Model Class Definition		Applied to P25-CAB-CAI_Test_Req Mar 2010, 2.1.3.2
Model Class Name	Product Name, Definition, and Unique ID	Installed Options
TK 5330 Series Portable	TK 5330 Portable	<b>Firmware:</b> K 1.11.01; Trunking, Encryption
		<b>Firmware:</b>

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 case 2.2.3.4.4 is not applicable for these infrastructures; see results of test 2.2.3.4.3.
N1: EF Johnson 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 EF Johnson 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
N7: TK 5330 meets timing requirements in the 45 ms slot timing mode.
P1: EF Johnson TK 5330 VHF subscriber passes Reference Sensitivity ( $\leq -116$ dBm) specification for C4FM (Non-Simulcast) and Simulcast modulations.
P2: EF Johnson TK 5330 VHF subscriber passes Faded Reference Sensitivity ( $\leq -108$ dBm) specification for C4FM (Non-Simulcast) and Simulcast modulations.
P3: EF Johnson TK 5330 VHF subscriber passes Signal Delay Spread Capability specification for C4FM (Non-Simulcast) ( $\geq 50$ $\mu$ s) and Simulcast modulations ( $\geq 80$ $\mu$ s).
P4: EF Johnson TK 5330 VHF subscriber passes Adjacent Channel Rejection ( $\geq 60$ dB) specification for C4FM (Non-Simulcast) and Simulcast modulations.

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

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