

Project 25 Compliance Assessment Program
Summary Test Report
TK-5810 Mobile Radio, UHF
STR-KWRD-TK5810-0911

Device Under Test Description	
Manufacturer	JVC Kenwood Corporation Kenwood USA Corporation
Manufacturer Contact	Donald E. Wingo, 678-474-4719
Product Name	TK-5810
Frequency Band	400 – 470 MHz / 450 – 520 MHz
Installed Options	P25 Conventional P25 Trunking P25 DES (multi-keys) encryption P25 AES (multi-keys) encryption
Installed Vocoder	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.

Laboratory Information	
P25 CAP Laboratory Number	P25CAP081016
Date(s) of Test	27 September – 1 October 2010 / 24 March - 28 April 2011 (Simulcast)
Date of Issue	1 October 2010 / 28 April 2011 (Simulcast)
P25 CAP Laboratory Number	P25CAP081016
Date(s) of Test	27 September – 1 October 2010
Date of Issue	1 October 2010
P25 CAP Laboratory Number	P25CAP081012
Date(s) of Test	8 March 2010
Date of Issue	12 March 2010
P25 CAP Laboratory Number	P25CAP081016
Date(s) of Test	17 June 2010
Date of Issue	17 June 2010
P25 CAP Laboratory Number	P25CAP081015
Date(s) of Test	3 September 2010
Date of Issue	10 September 2010

Project 25 Compliance Assessment Program
Summary Test Report
TK-5810 Mobile Radio, UHF
STR-KWRD-TK5810-0911

Informative References	
Date	Title
March 2010	P25-CAB-CAI_TEST_REQ

Other Devices Tested with: Kenwood TK-5x10 (Model Class*)

Manufacturer	Product Name, Definition, and Unique ID	Installed Options
Motorola	ASTRO 25 System	Release 7.8
PowerTrunk	PowerTrunk 25, B800014	Version 9.4.52
Raytheon	Raytheon P25netCC Phase 1	RNC 2.09.001 / BSC 2.09.003 / NLR 2.05.001

**Kenwood 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-TIMCO081016-TK-5810-K	
Performance – Conventional Receiver Tests TK-5810 (UHF)			
Test Case	Description	Requirement	Results
2.1.4	Reference Sensitivity	≤ -116 dBm	P1
2.1.5	Faded Reference Sensitivity	≤ -108 dBm	P2
2.1.6	Signal Delay Spread Capability	≥ 50 us	P3
2.1.7	Adjacent Channel Rejection	≥ 60 dB	P4
2.1.8	Co-Channel Rejection	≥ 9 dB	P
2.1.9	Spurious Response Rejection	≥ 80 dB	P
2.1.10	Intermodulation Rejection	≥ 75 dB	P
2.1.11	Signal Displacement Bandwidth	≥ 1000 Hz	P
2.1.17	Late Entry Unsilence Delay No Talk Group or Encryption Talk Group Only Encryption Only Both (On Clear or Encrypted Channel)	≤ 125 ms ≤ 370 ms ≤ 370 ms ≤ 460 ms	P P P P
2.1.18	Receiver Throughput Delay	≤ 125 ms	P

Project 25 Compliance Assessment Program

Summary Test Report

TK-5810 Mobile Radio, UHF

STR-KWRD-TK5810-0911

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.1 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Performance		DTR-TIMCO081016-TK-5810-K	
Performance – Conventional Transmitter Tests TK-5810 (UHF)			
Test Case	Description	Requirement	Results
2.2.8	Unwanted Emissions: Adjacent Channel Power Ratio	≥ 67 dB	P
2.2.12	Transmitter Power Attack Time Encoder Attack Time	≤ 50 ms	P
		≤ 100 ms	P
2.2.14	Transmitter Throughput Delay	≤ 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 t1 = 10 ms Time Interval t2 = 25 ms Time Interval t3 = 10 ms	$\{\Delta f\} \leq 12.5$ kHz	P
		$\{\Delta f\} \leq 6.25$ kHz	P
		$\{\Delta f\} \leq 12.5$ kHz	P

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance		DTR-TIMCO081016-TK-5810-K	
Performance – Trunked Receiver Tests TK-5810 (UHF)			
Test Case	Description	Requirement	Results
2.1.4	Reference Sensitivity	≤ -116 dBm	P1
2.1.5	Faded Reference Sensitivity	≤ -108 dBm	P2
2.1.6	Signal Delay Spread Capability	≥ 50 us	P3
2.1.7	Adjacent Channel Rejection	≥ 60 dB	P4
2.1.8	Co-Channel Rejection	≥ 9 dB	P
2.1.9	Spurious Response Rejection	≥ 80 dB	P
2.1.10	Intermodulation Rejection	≥ 75 dB	P
2.1.11	Signal Displacement Bandwidth	≥ 1000 Hz	P

Project 25 Compliance Assessment Program
Summary Test Report
TK-5810 Mobile Radio, UHF
STR-KWRD-TK5810-0911

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance		DTR-TIMCO081016-TK-5810-K	
Performance – Trunked Transmitter Tests TK-5810 (UHF)			
Test Case	Description	Requirement	Results
2.2.8	Unwanted Emissions: Adjacent Channel Power Ratio	≥ 67 dB	P
2.2.12	Transmitter Power Attack Time	≤ 50 ms	P
		Encoder Attach Time	≤ 100 ms
2.2.14	Transmitter Throughput Delay	≤ 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 t1 = 10 ms	$\{\Delta f\} \leq 12.5$ kHz	P
	Time Interval t2 = 25 ms	$\{\Delta f\} \leq 6.25$ kHz	P
	Time Interval t3 = 10 ms	$\{\Delta f\} \leq 12.5$ kHz	P

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance		DTR-TIMCO081016-TK-5810-K	
Performance – Trunked Transmitter Tests TK-5810 (UHF)			
Test Case	Description	Requirement	Results
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	≤ 1.57 ms	P
2.3.2	Trunking Request Time (45 ms Slot)	≤ 167 ms	P
2.3.3	Trunking Voice Access Time	≤ 1000 ms	P5
2.3.5	Transmit Time to Key on Traffic Channel		
	RF TX time to Key – Working Channel	150 ms	P
	Encoder Transmit Time	150 ms	P

Project 25 Compliance Assessment Program

Summary Test Report

TK-5810 Mobile Radio, UHF

STR-KWRD-TK5810-0911

Interoperability Test Cases and Results

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.3.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Interoperability		DTR-MOT-40245-M6-MC2	DTR-TIMCO-0801016 TK-5410GK2	DTR-P25CAP0810 15-3186
Kenwood Model Class – TK-5x10, Hardware V3.0		Motorola	PowerTrunk	Raytheon
Test Case	Description	Result		
2.2.1	Full Registration			
2.2.1.4.1	Test Case 1 – Valid Registration			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.1.4.2	Test Case 2 – Denied or Refused Registration			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.1.4.3	Test Case 3 – Unverified Registration			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.2	Group Voice Call			
2.2.2.4.1	Test Case 1 – Group Call Granted			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.2.4.2	Test Case 2 – Group Call Denied			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.2.4.3	Test Case 3 – Group Call Request Queued			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7

Project 25 Compliance Assessment Program

Summary Test Report

TK-5810 Mobile Radio, UHF

STR-KWRD-TK5810-0911

2.2.3	Unit-to-Unit Voice Call			
2.2.3.4.1	Test Case 1 – Unit-to-Unit with Target Availability Check			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.3.4.2	Test Case 2 – Unit-to-Unit with Target Availability Check Denied by Target			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.3.4.3	Test Case 3 – Unit-to-Unit with Target Availability Check – Traffic Assignment After Target Availability Check			
	Home Configuration	P	NA2	NA3
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.3.4.4	Test Case 4 – Unit-to-Unit with Target Availability Check – Traffic Assignment Before Target Availability Check			
	Home Configuration	NA1	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.3.4.5	Test Case 5 – Unit-to-Unit Call without Target Availability Check			
	Home Configuration	N1	N2	N3
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.3.4.6	Test Case 6 – Unit-to-Unit Call Queued without Target Availability Check			
	Home Configuration	N1	N2	N3
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.3.4.7	Test Case 7 – Unit-to-Unit Call Denied			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7

Project 25 Compliance Assessment Program

Summary Test Report

TK-5810 Mobile Radio, UHF

STR-KWRD-TK5810-0911

2.2.4	Broadcast Voice Call			
2.2.4.4.1	Test Case 1 – Broadcast Voice Call			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.5	Affiliation			
2.2.5.4.1	Test Case 1 – Radio Permitted to Affiliate with New Group			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.5.4.2	Test Case 2 – Radio Denied Affiliation to New Group			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.6	Announcement Group Call			
2.2.6.4.1	Test Case 1 – Collection of Talk Groups Receive Call			
	Home Configuration	P	N4	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.7	Emergency Alarm			
2.2.7.4.1	Test Case 1 – Emergency Alarm			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.8	Emergency Group Call			
2.2.8.4.1	Test Case 1 – Emergency Call			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7
2.2.10	Encryption			
2.2.10.4.1	Test Case 1 – Call Privacy for Encrypted Call			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7

Project 25 Compliance Assessment Program

Summary Test Report

TK-5810 Mobile Radio, UHF

STR-KWRD-TK5810-0911

2.2.11	Intra-Location Registration Area Roaming			
2.2.11.4.1	Test Case 1 – Idle Radio			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N5	N6	N7
	Inter-WACN Roaming Configuration	N5	N6	N7

Model Class: TK-5x10 Subscriber	
Product Name, Definitions and Unique ID	Model Number and Installed Options
TK-5810 UHF Mobile (GK, GK2, HGK, HGK2)	FW Ver. G5.10 – G20; Trunking, Encryption

Test Case Results Definitions	
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)
Comments	
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 (≥ 50 us) and Simulcast (≥ 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: Test cases 2.2.3.4.5 and 2.2.3.4.6 are not supported by Motorola FNE.	
N2: Test cases 2.2.3.4.5 and 2.2.3.4.6 are not supported by PowerTrunk FNE.	
N3: Test cases 2.2.3.4.5 and 2.2.3.4.6 are not supported by Raytheon FNE.	
N4: Test case 2.2.6.4.1 is not supported by PowerTrunk FNE.	
N5: Motorola infrastructure does not support Inter-System or Inter-WACN roaming.	
N6: Power Trunk infrastructure does not support Inter-System or Inter-WACN roaming.	
N7: Raytheon infrastructure does not support Inter-System or Inter-WACN roaming.	
NA1: Test case 2.2.3.4.4 is not applicable to Motorola FNE; see results of test case 2.2.3.4.3.	
NA2: Test case 2.2.3.4.3 is not applicable to PowerTrunk FNE; see results of test case 2.2.3.4.4.	
NA3: Test case 2.2.3.4.3 is not applicable to Raytheon FNE; see results of test case 2.2.3.4.4.	
N/A1: "Not Applicable" test	

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TK-5810 Mobile Radio, UHF
STR-KWRD-TK5810-0911

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