

IFF-45TSL

MK XIIB/TACAN Bench Test Set

User Interface

Interfaces Supported	IEEE-488, RS232 and Ethernet (VXI-11)
	Windows PC based GUI provided

Modes of Operation

Transponder Testing	1, 2, 3/A, C, S, 4, 5
Interrogator Testing	1, 2, 3/A, C, S, 4, 5
DME/TACAN Testing	G/A, INV G/A, BG/A, BA/A, A/A, INV A/A
ADS-B In and Out	
GICB Decode	



Signal Generator

Frequency Range	
± 10 MHz from the actual band of 962 to 1213 MHz that is defined for DME/TACAN, 10 kHz resolution	
Output Amplitude Direct Port	
0.0 dBm to -110.0 dBm (into 50 Ω) in 0.1 dB increments	
Accuracy@ 25° $\pm$ 5° C	
0.0 dBm to -80.0 dbm	± 0.5 dB
< -80.0 dBm to -100 dBm	$\pm [0.5 \text{ dB} + 0.05 \text{ dB per dB below } -80 \text{ dBm}]^1$
< -100.0 dBm	$\pm [1.5 \text{ dB} + 0.35 \text{ dB per dB below } -100 \text{ dBm}]^2$
Accuracy over full temp	
0.0 dBm to -80.0 dbm	± 1.0 dB
< -80.0 dBm to -100 dBm	$\pm [1.0 \text{ dB} + 0.10 \text{ dB per dB below } -80 \text{ dBm}]^2$
< -100.0 dBm	$\pm [3.0 \text{ dB} + 0.70 \text{ dB per dB below } -100 \text{ dBm}]^2$
Antenna Port	
30.0 dBm to -60.0 dBm (into 50 Ω) in 0.1 dB increments	
Accuracy @ 25° $\pm$ 5° C	
Power $\geq$ -30.0 dBm	± 1.0 dB
Power < -30.0 dBm	$\pm [1.0 \text{ dB} + 0.033 \text{ dB per dB below } -30 \text{ dBm}]^2$
Accuracy over full temp	
Power $\geq$ -30.0 dBm	± 2.0 dB
Power < -30.0 dBm	$\pm [2.0 \text{ dB} + 0.066 \text{ dB per dB below } -30 \text{ dBm}]^2$

- Hence, for a power setting of -85 dBm, the accuracy will be $+ [0.5 + 0.05 \times 5]$, or ± 0.75 dB, and for a power setting of -95 dBm, the accuracy will be $\pm [0.5 + 0.05 \times 15]$, or ± 1.25 dB.
- As per example above

Signal Generator (continued)

Pulse Formats	
Transponder/Interrogator	1, 2, 3/A, C, S, National Secure Mode, Mode 5
Support for RTCA DO-181E and DO-260B; Support for AIMS 17-1000	
DME/TACAN	G/A, A/A, INVERSE G/A, INVERSE A/A, BEACON G/A, BEACON A/A
Pulse Position Deviations	
XPDR	$\pm 1 \mu\text{s}$
INT Non-Mode 5	$\pm 1 \mu\text{s}$
INT Mode 5	$\pm 0.25 \mu\text{s}$
Accuracy [XPDR/INT]	$\pm 10 \text{ ns}$
TACAN ³	$12 \pm 0.1 \mu\text{s}$
Accuracy [TACAN]	$\pm 100 \text{ ns}$
Pulse Width Deviations	
Transponder ⁴	Nominal $\pm 1.0 \mu\text{s}$ (fixed in Mode S-SPR)
Accuracy	$\pm 10 \text{ ns}$
Interrogator ⁴	Nominal $\pm 0.5 \mu\text{s}$
Accuracy	$\pm 10 \text{ ns}$
TACAN	0 to $5.5 \mu\text{s}$
Accuracy	$\pm 0.1 \mu\text{s}$
Pulse Amplitude	
XPDR/INT	6 to -15 dB
TACAN	5 to -15 dB
Interference Pulse Characteristics (1 or 2 pulses)	
Position	-1 to $400 \mu\text{s}$ relative to reference
Offset Range	
XPDR	-44 to $400 \mu\text{s}$
INT	-1 to $400 \mu\text{s}$
Accuracy	$\pm 10 \text{ ns}$
Interference Pulse Spacing (multiple pulse interference mode)	
Range	-44 to $400 \mu\text{s}$ relative to 1st Pulse (XPDR) -1 to $400 \mu\text{s}$ (Interrogator)
Max 2nd pulse position	$400 \mu\text{s}$ - 1st pulse position
Accuracy	$\pm 10 \text{ ns}$

3. Pulse overlap not allowed

4. Minimum pulse width is 200 ns

Signal Generator (continued)

Range Delay	
DME/TACAN	1 to 400.00 nmi in 0.01 nm steps. Optional offset of -1 nm.
Accuracy	0.02 nm or 0.0003% of simulated range
INT	0 to 400.00 nmi
Accuracy	±0.01 nmi
Diversity	
Timing (either channel)	0 to ±1 µs, ±10 ns accuracy
Echo	
Position	30 nmi ±0.2 nmi
Pulse Pair Spacing	Same as Reply
Amplitude	-15 to 6 dB, referenced to the nominal reply
Resolution	0.1 dB
Accuracy	±0.25 dB
Channel Signal Assignment	
Transponder Test	Top/Bottom
Interrogator Test	Sum/Difference
TACAN	Top/Bottom
Interrogation Generator	
Independent/Unique Interrogations 1-12	
Fixed Mode	SIF Mode: 1 to 10000 PRF
	Mode 5: 1 to 1200 PRF
	Mode S: 1 to 2500 PRF
	NSM: 1 to 3500 PRF (internal) 1 to 2500 PRF (external)
Double/Supermode	
Spacing between interrogations (slaved delay)	0 to 400 µs
Pair generation rate	1 to 400 PRF
Supermode interrogations	2 interrogations
Burst Mode	
Bursts/trigger	1 to 1000 or infinite
Interrogations/burst	1 to 2500
Interrogation rate (within a burst)	1 to 3800 PRF
Spacing between burst sequences	0.1 to 20 sec
Interlaced Mode	
Interlace ratio	1:1 to 1:63
Group rate	1 to 400 PRF

Signal Generator (continued)

Reply Generator	
Independent/Unique Replies	1 to 12
Data and Range	Individually configured
Selectable Modes	1,2,3/A,C,ACLA,ACLC,S,4,5
Selectable Efficiency	1 to 100%
Spectral Purity Residual Level	
Harmonics	Direct: <50 dBc
	Antenna: <40 dBc
Spurious (> modulation BW)	<60 dBc, 350 to 1800 MHz
Phase Noise	<80 dBc/Hz @ 100 kHz

Signal Receiver Measurements

Frequency Range	
1020 MHz to 1155 MHz	
Output Amplitude Direct Port	
Pulse Power Measurements	
25 ±5° C	Direct: 10 to 66 dBm: +0.5 dB
	Antenna: -40 to 30 dBm: +1 dB
	Resolution: 0.01 dB
-10° to 55° C	Direct: 10 to 66 dBm: +1 dB
	Antenna: -40 to 30 dBm: +2 dB
	Resolution: 0.01 dB
Pulse to Pulse Spacing	
XPDR/INT	
Non-Mode 5	±0.3 µs
Mode 5	±0.0625 µs
Accuracy	±10 ns
TACAN	±0.5 µs
Accuracy	±50 ns
Reply Delay	
Accuracy	±20 ns
Reply Delay Jitter	
Accuracy	±20 ns
Frequency	
Accuracy	±50 kHz

Signal Receiver Measurements (continued)

% Reply	
Range	0 to 100% for each interrogation type
Resolution	0.0125% (for sample size = 8000)
Sample Size	1 to 8000 interrogations

Specific Application

TACAN/DME	
Ident	
Variable	10 sec to 65 sec
Alphanumeric Character	0 to 9 [A to Z]
Bearing	
Bearing Input Range	0° to 359.99° in 0.01° steps
Bearing Accuracy	±0.05°
Bearing Rate	-39° to 39° sec in 0.01° steps
Velocity	
Range	0 to 9999 Kts in 1 Kt steps
Accuracy	±0.001%
Squitter	
Range	0 to 8000 Hz
Accuracy	10 Hz or 2%, whichever is greater
Distribution	Compliant with ARINC 568 @ 2700 Hz
Main Reference Burst	
Adjustable Burst (all modes)	1, 2, -1 or -2
Selectable	On/Off
X Channel	12 pulse pairs
Y Channel	13 single pulses
A/A (all channels)	10 single pulses
Accuracy	±100 ns
Auxiliary Reference Burst	
Adjustable Burst (all modes)	1, 2, -1, or -2
X Channel	6 pulse pairs
Y Channel	13 single pulses
Accuracy	±100 ns

Specific Application (continued)

TACAN Modulation	
Range	0% to 39% in 1 Hz steps (15 Hz and 135 Hz separately adjustable)
Accuracy	±1%
Distortion	<5% of either tone
A/A Interrogation Rate	0 to 3999 Hz in 1 Hz steps
Reply Efficiency	0 to 100% in 1% steps
Crypto Appliqué Compatibility	
AIMS 04-900A Option A - KIV-78 and QRTK6 NG	
AIMS 04-900A Option B - KIV-77, KIV-79 and SIT-2010	
KIV-6	
Built-in Crypto Appliqué Function	
NSM Internal Crypto Simulator (standard) Word A/B, C1 - C16	
Mode 5 Internal Crypto Simulator (standard with options 1 and 3) As defined by the U.S. Navy Mode 5 Program Office	

Interface Signals

Analog Signal Ports (programmable output)	
2 Ports	
Programmable Sources	Various
Level	±1 V into 50 Ω
Trigger Out (front panel)	
Programmable Source	TX timing ref, RX detection
Level	3.3 V logic
Trigger In (front panel)	
Functions	Interrogation Trigger Reply Trigger
Level	3.3 or 5 V logic
Suppression Out	
Amplitude into 2 KΩ	12 V to 80 V
Variable Pulse Width	0.25 to 300 μs
Suppression In	
Amplitude	10 V to 80 V
Impedance	2.2 KΩ
Action	Inhibits response to incoming signal

General

Frequency/Time Reference	2.5 ppm composed of 1 ppm/year aging and 1 ppm accuracy over temp
External Reference Input	External 10 MHz Source
VSWR	Direct: 1.2:1 over frequency range
	Antenna: 2.5:1 over frequency range
Input Power	100-240 VAC, 50-60 Hz, 3 Amp fuse

Environmental

Temperature Range	-10° to 55° C (14° to 131° F)
Warm-up (for specified accuracy)	45 minutes

Physical Characteristics

Rackmount (with handles)	
Size	3.5" H x 19" W x 21.5" D (8.89 x 48.26 x 54.61 cm)
Weight	26 lbs (11.79 kg)
Benchtop (with handles, feet, and bezels)	
Size	4.5" H x 19" W x 21.5" D (11.43 x 48.26 x 54.61 cm)
Weight	27 lbs (12.27 kg)

Test Set Certifications

UL
CE
DoD AIMS MK XIIB Level 1 and Level 2, Level IIB (pending)

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