

Data Sheet

VIAVI AVX-10K

Flight Line Test Set

Transponder Mode

Signal Generator

A 5-minute warm-up period is required for all specifications.

RF Output Frequency

Interrogation Frequency	1030 MHz
Accuracy	±10 kHz

RF Output Level

Antenna Connector	(MTL + 6 dB typical, automatically controlled for a MTL range of -83 to -68 dBm)
Range	-67 to -2 dBm at antenna connector
Resolution	0.5 dB
Accuracy	±2 dB
Distance to UUT Antenna	6 to 200 ft with supplied antenna
RF I/O Connector	(MTL + 6 dB typical, automatically controlled)
Range	-115 to -47 dBm
Resolution	0.5 dB
Accuracy	-95 to -47 dBm, ±1 dB
Accuracy	-115 to <-95 dBm, ±2 dB



ATCRBS/MODE S Interrogation Pulse Spacing

Mode A	
P1 to P2	2.00 µs (±25 ns)
P1 to P3	8.00 µs (±25 ns)
Mode C	
P1 to P2	2.00 µs (±25 ns)
P1 to P3	21.00 µs (±25 ns)
Mode S	
P1 to P2	2.00 µs (±25 ns)
P1 to P6	3.50 µs (±25 ns)
P1 to SPR	4.75 µs (±25 ns)
P5 to SPR	0.40 µs (±50 ns)

Intermode Interrogation Pulse Spacing

Mode A	
P1 to P3	8.00 µs (±25 ns)
P1 to P4	10.00 µs (±25 ns)
Mode C	
P1 to P3	21.00 µs (±25 ns)
P1 to P4	23.00 µs (±25 ns)

Interrogation Pulse Widths

Modes A, C, S, Intermode	
P1, P2, P3	0.80 µs (±50 ns)
Mode S	
P6 (Short DPSK Block)	16.25 µs (±50 ns)
P6 (Long DPSK Block)	30.25 µs (±50 ns)
P5	0.80 µs (±50 ns)
Intermode	
P4 (Short)	0.80 µs (±50 ns)
P4 (Long)	1.60 µs (±50 ns)

Interrogation Pulse Rise and Fall Times (All Modes)

Rise Time	50 to 100 ns
Fall Time	50 to 200 ns

Transponder Mode continued

Phase Modulation (All Modes)

Transition Time	<80 ns
Phase Shift	180° (±10°)

SLS Levels (Automatically controlled in the SLS LEVEL test)

ATCRBS	
SLS Level (P2)	-9 dB, -1 to +0 dB relative to P1 level
	0 dB, -0 to +1 dB relative to P1 level
	OFF
Mode S	
SLS Level (P5)	-12 dB, -1 to +0 dB relative to P6 level
	+3 dB, -0 to +1 dB relative to P6 level
	OFF

Note: SLS level is automatically controlled in the SLS LEVEL test.

Interrogation Test Signals

Mode S	PRF: 50 Hz (±5 Hz)
ATCRBS	PRF: 235 Hz (±5 Hz)

UUT Measurements

ERP (@ 1090 MHz)

Range	+45.5 to +59 dBm (35.5 to 800 watts)
Resolution	0.1 dB
Accuracy	±2 dB

Direct Connection Peak Pulse Power (@ 1090 MHz)

Range	+46.5 to +59 dBm (45 to 800 Watts)
Resolution	0.1 dB
Accuracy	±1 dB

Transmitter Frequency

Range	1087.000 to 1093.000 MHz
Resolution	10 kHz
Accuracy	±50 kHz

Receiver Sensitivity, Radiated MTL

Range	-79 to -67 dBm into 0 dBi antenna
Resolution	0.1 dB
Accuracy	±2 dB, typical

Reply Delay

ATCRBS	
Range	1.80 to 7.00 µs
Resolution	10 ns
Accuracy	±50 ns
Reply Delay, Mode S and ATCRBS Mode S ALL-CALL	
Range	125.00 to 131.00 µs
Resolution	10 ns
Accuracy	±50 ns

Reply Delay Jitter

ATCRBS	
Range	0.00 to 2.30 µs
Resolution	1 ns
Accuracy	±20 ns
Mode S and ATCRBS Mode S ALL-CALL	
Range	0.00 to 6.00 µs
Resolution	1 ns
Accuracy	±20 ns

Pulse Spacing

F1 to F2	
Range	19.70 to 21.60 µs
Resolution	1 ns
Accuracy	±20 ns
Mode S Preamble	
Range, P1 to P2	0.8 to 1.2 µs
Range, P1 to P3	3.3 to 3.7 µs
Range, P1 to P4	4.3 to 4.7 µs
Resolution	1 ns
Accuracy	±20 ns

Pulse Widths

F1 to F2	
Range	0.25 to 0.75 µs
Resolution	1 ns
Accuracy	±20 ns
Mode S Preamble	
Range	0.25 to 0.75 µs
Resolution	1 ns
Accuracy	±20 ns

PULSE Amplitude Variation

Range	
Mode S (Relative to P1)	-3 to +3 dB
ATCRBS (Relative to F1)	-3 to +3 dB
Resolution	0.1 dB (0.01 dB via RCI)
Accuracy	±0.5 dB

DF 11 Squitter Period

Range	0.10 to 4.88 sec
Resolution	10 ms
Accuracy	±10 ms

Diversity Isolation

Range	0 to >20 dB (depending on test distance)
Test Distance	1.83 m (6ft) to 28.96 m (95 ft)
Resolution	0.1 dB
Accuracy	±3 dB

UAT Mode

Signal Generator	
RF Output Frequency	
Transmit Frequency	978 MHz
Accuracy	±10 kHz
Output Level	
Antenna Connector	
Radiated power at 0 dBi UUT antenna	-85 dBm, automatically controlled
Range	-67 to -2 dBm at antenna connector
Resolution	0.5 dB
Accuracy	±2 dB
Distance to UUT antenna	6 to 150 ft. with supplied antenna
RF I/O Port	
Automatic mode	-85 dBm
Accuracy	±1 dB
Modulation	
Type	BPFSK per RTCA DO-282B
Deviation	±312.5kHz typical

TCAS Mode

Signal Generator	
Output Frequency	
Reply Frequency	1090 MHz
Accuracy	±10 kHz
Output Level (simulated ERP)	
Antenna Connector ¹	
Radiated power at 0 dBi UUT antenna	-68 dBm typical @ 10 Nmi (range, automatically controlled)
Range	-67 to -2 dBm at antenna connector
Resolution	0.5 dB
Accuracy	±2 dB
Distance to UUT antenna	6 to 300 ft. with supplied antenna
RF I/O Connector	
Automatic Mode	-68 dBm @ 10 Nmi (range automatically controlled)
Manual Mode Range	-115 to -47 dBm
Resolution	0.5 dB
Accuracy	-95 to -47 dBm, ±1 dB
Accuracy	-115 to <-95 dBm, ±2 dB
Reply Pulse Spacing	
Mode C	
F1 to F2	20.30 µs (±25 ns)
F1 to C1	1.45 µs (±25 ns)
F1 to A1	2.90 µs (±25 ns)
F1 to C2	4.35 µs (±25 ns)

F1 to A2	5.80 µs (±25 ns)
F1 to C4	7.25 µs (±25 ns)
F1 to A4	8.70 µs (±25 ns)
F1 to B1	11.60 µs (±25 ns)
F1 to D1	13.05 µs (±25 ns)
F1 to B2	14.50 µs (±25 ns)
F1 to D2	15.95 µs (±25 ns)
F1 to B4	17.40 µs (±25 ns)
F1 to D4	18.85 µs (±25 ns)

Mode S	
P1 to P2	1.00 µs (±25 ns)
P1 to P3	3.50 µs (±25 ns)
P1 to P4	4.50 µs (±25 ns)
P1 to D1	8.00 µs (±25 ns)
D1 to Dn (n=2 to 112)	1.00 µs times (n-1) (±25 ns)

Reply Pulse Widths

Mode C	
All pulses	0.45 µs (±50 ns)
Mode S	
P1 through P4	0.50 µs (±50 ns)
D1 through D112	0.50 µs (±50 ns), 1 µs chip width
Reply Modes	TCAS I / II Mode C (with altitude reporting) TCAS II Mode S formats 0, 11, 16

Reply Pulse Amplitudes

ATCRBS	±1 dB relative to F1
Mode S	±1 dB relative to P1

Reply Pulse Rise and Fall Times (All Modes)

Rise Time	30 to 100 ns
Fall Time	30 to 200 ns

Percent Reply

Range	0 to 100%
Resolution	1%
Accuracy	±1%

Reply Delay

ATCRBS	3.0 µs (±50 ns)
Mode S	128 µs (±50 ns)

Range Delay

Range	0 to 260 Nmi
Resolution	0.1 Nmi
Accuracy	±0.02 Nmi

Range Rate

Range	-1200 to +1200 kts
Resolution	10 kts
Accuracy	10%

Altitude Range

Range	-1000 to 126,000 ft.
Resolution, Mode C	100 ft.
Resolution, Mode S	25 ft.

¹Simulates a 50.5 dBm XPDR ERP at 10 Nmi range

TCAS Mode continued

Altitude Rate

Range	-10,000 to +10,000 fpm
Resolution	100 fpm
Accuracy	10%

Squitter

Control	On/Off
Rate	0.8 to 1.2 seconds, randomly distributed

Receiver

Pulse Spacing (ATCRBS, Mode C All Call)	
S1 to P1	2.0 μ s
Accepts	< \pm 200 ns
Rejects	> \pm 1.0 μ s
P1 to P3	21.0 μ s
Accepts	< \pm 200 ns
Rejects	(<10% Replies) > \pm 1.0 μ s
P1 to P4	23.0 μ s
Accepts	< \pm 200 ns
Rejects	(<10% Replies) > \pm 1.0 μ s
Mode S	
P1 to P2	2.0 μ s
Accepts	< \pm 200 ns
Rejects	(<10% Replies) > \pm 1.0 μ s
P1 to SPR	4.75 μ s
Accepts	< \pm 200 ns
Rejects	(<10% Replies) > \pm 1.5 μ s

Suppression

ATCRBS (P2 or S1)	
>0.5 dB above level of P1	<10% Replies

UUT Measurements

ERP (@ 1030 MHz)

ATCRBS	
Range	+43 to +58 dBm (20 to 631 watts)
Resolution	0.1 dB
Accuracy	\pm 2 dB
Mode S	
Range	+43 to +58 dBm (20 to 631 watts)
Resolution	0.1 dB
Accuracy	\pm 2 dB

Direct Connection Peak Pulse Power (@ 1030 MHz)

ATCRBS	
Range	+43 to +58 dBm (20 to 631 watts)
Resolution	0.1 dB
Accuracy	\pm 1 dB

Mode S

Range	+43 to +58 dBm (20 to 631 watts)
Resolution	0.1 dB

Accuracy	\pm 1 dB
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Frequency

Range	1029.900 to 1030.100 MHz
Resolution	1 kHz
Accuracy	\pm 10 kHz

TCAS Broadcast Interval

Range	1.0 to 12.0 sec
Resolution	0.1 sec
Accuracy	\pm 0.2 sec

DME Mode

Signal Generator

Output Frequency

Reply Frequency	Range: 962 to 1213 MHz
	Accuracy: \pm 10 kHz

Output Level

Antenna Connector	Range: -67 to -2 dBm at antenna port
	Resolution: 1 dB
	Accuracy: \pm 2 dB
	Distance to UUT antenna: 6 to 300 ft with supplied antenna
RF I/O Port	Range: -115 to -47 dBm
	Resolution: 1 dB
	Accuracy: -95 dBm to -47 dBm, \pm 1 dB
	Accuracy: -115 dBm to <-95 dBm, \pm 2 dB

UUT Measurements

ERP

Range	+47 to +64 dBm
Resolution	0.1 dB
Accuracy	\pm 2 dB

Direct Connection Peak Pulse Power

Range	+47 to +64 dBm
Resolution	0.1 dB
Accuracy	\pm 1 dB

Frequency

Range	1025.00 to 1150.00 MHz
Resolution	10 kHz
Accuracy	\pm 20 kHz

Antenna Test

SWR/DTF

SWR Meter (at SWR Port)

Frequency Range	10.0 MHz to 1250.0 MHz
Measurement Range	1.1 to 6.5
Accuracy	SWR < 3:1 (\pm 0.2 \pm 20% of reading) SWR \geq 3:1 (\pm 0.3 \pm 20% of reading)
Accuracy	TBD

Cable Loss (at SWR Port)	
Measurement Range	0 dB to 30 dB
Resolution	0.01 dB
Accuracy	1.5 feet +/-1% of distance

Misc. Inputs/Outputs

RF I/O	
Type	Input/Output
Impedance	50 Ω typical
Maximum Input Level	4 kW peak, 10 W average
VSWR	<1.3:1

Antenna	
Type	Input/Output
Impedance	50 Ω typical
Maximum Input Level	10 W peak, 0.5 W average
VSWR (30 to 1213MHz)	<1.7:1

VSWR	
Type	Input/Output
Impedance	50 Ω typical
Maximum Input Level	20 mW max, 0V DC

Discretes	
1PPS	LVTTTL L1 C/A code frame sync output
Trigger	LVTTTL active high, >1 us wide

Test Antenna	
VSWR	<1.5:1
Gain	8 dB, Typical

Time Base (TCXO)	
Temperature Stability	± 1 ppm
Aging	± 1 ppm per year
Accuracy	± 1 ppm

Battery	
Type	Li Ion
Duration	>4 hrs continuous operation >8 hrs, Typical

Input Power (Test Set)	
Input Range	11VDC-16VDC
Power Consumption	<60W Max

Input Power (Supplied External AC to DC Converter)	
Input Range	100 to 250 V AC, 1.5 A Max, 47 to 63 Hz
Mains Supply Voltage Fluctuations	<10% of the nominal voltage
Transient Over-voltages	According to Installation, Category II

Environmental

Test Set	
Use	Pollution Degree 2
Altitude	≤ 4800 meters
Operating Temp. ²	-20°C to 45°C (-4° to 113°F) Continuous Use $\geq 45^\circ\text{C}$ to 55°C (113° to 131°F) Intermittent Use (protected by automatic shutdown)
Storage Temp. ³	-30°C to 71°C (-22° to 159.8°F)
Relative Humidity	95% ($\pm 5\%$) from 5° to 30°C (41° to 86°F) 75% ($\pm 5\%$) from 30° to 40°C (86° to 104°F) 45% ($\pm 5\%$) from 40° to 55°C (104° to 131°F)

Supplied External AC to DC Converter	
Use	Indoors

Physical Characteristics

Dimensions	
Height	12 in. (30.48 cm)
Width	5.3 in. (13.5 cm)
Depth	4 inches (10.2 CM)
Weight (Test set only)	6.5 lb (2.94 kg)

Certifications

Test Set	
Altitude, operating	MIL-PRF-28800F, Class 2
Altitude, not operating	MIL-PRF-28800F, Class 2
Bench Handling	MIL-PRF-28800F, Class 2
Blowing Dust	MIL-STD-810F, Method 510.4, Procedure 1
Drip-proof	MIL-PRF-28800F, Class 2
Explosive Atmosphere	MIL-STD-810F Method 511.4, Procedure 1
Safety Compliance	UL-61010B-1, EN 61010-1, CSA 22.2 No 61010-1
EMC	EN 61326
Relative Humidity	MIL-PRF-28800F, Class 2
Shock, Functional	MIL-PRF-28800F, Class 2
Vibration Limits	MIL-PRF-28800F, Class 2
Temp, operating ⁴	MIL-PRF-28800F, Class 2
Temp, not operating ⁵	MIL-PRF-28800F, Class 2 (with battery removed)
Transit Drop	MIL-PRF-28800F, Class 2

External AC-DC Converter	
Safety Compliance	IEC 60950-1:2006
EMI/RFI Compliance	FCC PART 15 CLASS B ISED ICES-003 Issue 6 CISPR32: 2012 EN55032: 2012 VCCI LEVEL II

⁴Temperature range extended to -20°C to 55°C (-4° to 131°F)

⁵Temperature range reduced to -30°C to 71°C (-22° to 159.8°F)

²Battery charging temperature range: 5°C to 40°C (41°F to 104°F) (controlled by internal charger)

³Li Ion Battery must be removed below -20°C (-4°F) and above 60°C (140°F)



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