VIAVI Solutions

Data Sheet

VIAVI
IFR4000
Nav/Comm Flight Line Test Set

Note: A 15 minute warm-up period is required for all specifications.

RF Signal Generator

Marker Beacon Channel	72.0 to 78.0 MHz in 25 kHz steps
Marker Beacon Pre-set	74.5, 75.0 or 75.5 MHz
Marker Beacon Variable	72.0 to 78.0 MHz in 1 kHz steps
VOR Channel	108.0 to 117.95 MHz in 50 kHz steps
VOR Pre-set	108.0, 108.05 or 117.95 MHz
VOR Variable	107.0 to 118.0 MHz in 1 kHz steps
LOC Channel	108.1 to 111.95 MHz in 50 kHz steps
LOC Pre-set	108.1, 108.15 or 110.15 MHz
LOC Variable	107.0 to 113.0 MHz in 1 kHz steps
G/S Channel	329.15 to 335.0 MHz in 50 kHz steps
G/S Pre-set	334.25, 334.55 or 334.70 MHz
G/S Variable	327.0 to 337.0 MHz in 1 kHz steps
Comm AM Channel	10.0000 to 400.0000 MHz in 25 kHz steps, 118.0000 to 156.0000 in 8.33 KHz steps
Comm Am Preset	118.00, 137.00 or 156.00 MHz (VHF Band) 225.00, 312.00, 400.00 MHz (UHF Band)
Comm AM Variable	10.0000 to 400.0000 MHz in 1 kHz steps

Comm FM Channel	10.0000 to 400.0000 MHz in 12.5, or 25 kHz steps
Comm FM Pre-set	156.00, 165.00, or 174.00 MHz
Comm FM Variable	10.0000 to 400.0000 MHz in 1 kHz steps
Comm SSB Channel	10.0000 to 30.0000 MHz in 100 Hz steps
SELCAL Channel	118.0 to 156.0 MHz in 25 kHz steps
SELCAL Pre-set	118.0, 137.0, or 156.0 MHz
SELCAL Variable	117.0 to 157.0 MHz in 1 kHz steps
Frequency Accuracy	
Same as time base	
Output Level	
Antenna Connector	
Single Carrier	
10 MHz to 75 MHz	-17 to -67 dBm in 0.5 dB steps
75 MHz to 400 MHz	+13 to -67 dBm in 0.5 dB steps
Accuracy	±3 dB
Dual Mode – LOC	0 dBm fixed
Accuracy	±2.5 dB
Dual Mode - G/S	0 to -76 dBm in 0.5 dB steps
Accuracy	±3 dB
Tri-Mode – Marker	+13 dBm fixed
Accuracy	±2 dB
Tri-Mode - LOC	-7 dBm fixed
Accuracy	±2 Hz
Tri-Mode - G/S	-7 to -83 dBm in 0.5 dB steps
Accuracy	±3 dB

Output Level (continued)	
RF I/O Connector	
Single Carrier	
10 MHz to 75 MHz	-40 to -130 dBm in 0.5 dB steps
75 MHz to 400 MHz	-12 to -130 dBm in 0.5 dB steps
Accuracy	
-12 to -39.5 dBm	±2.5 dB
-40 to -94.5 dBm	±2.0 dB
-95 to -120 dBm	±3 dB
Dual Mode - LOC	-22 dBm fixed
Accuracy	±2 dB
Dual Mode - G/S	-22 to -101 dBm in 0.5 dB steps ±2.5 dB
Spectral Purity	
Harmonics	<-20 dBc
Non-harmonics Spurious	<-35 dBc between 10 and 400 MHz

VOR MODE

VOR Tone Frequency Accuracy	
30 Hz Reference	±0.02%
30 Hz Variable	±0.02%
1020 Hz	±0.02%
9960 Hz	±0.02%
AM Modulation	
CAL	
30 and 9960 Hz tones	30% AM, each tone
Accuracy	±1% modulation
1020 Hz tone	30% AM
1020 Hz Morse Code	10% AM
Accuracy	± 2% modulation
Variable	Range: 0% to 55% AM (30, 9960, and 1020 Hz tones)
	Distortion: <2.0 % in CAL position
FM Modulation	
30 Hz reference at ±480 Hz peak deviation on 9960 Hz sub-carrier	
Accuracy	±25 Hz peak deviation
Bearing	
To - from selectable	
Preset Bearing	0°, 30°, 60°, 90°, 120°, 150°, 180°, 210°, 240°, 270°, 300°, and 330°
Variable Bearing	3600 digitally derived courses in 0.1° increments
Accuracy	±0.1°

LOC MODE

LOC Tone Frequency Accuracy	
90 Hz	±0.02%
150 Hz	±0.02%
1020 Hz	±0.02%

Modulation	
CAL	
90 and 150 Hz Tones	20% AM each tone
1020 Hz Audio Tone	30% AM
1020 Hz Morse Tone	10% AM
Accuracy	±2% modulation
Variable	
Range	0% to 28% AM (90 and 150 Hz tones)
	0% to 42% AM (1020 Hz tone)
Distortion	<2.5% in CAL position
LOC DDM	
Fixed	Range: ±0, 0.093, 0.155 or 0.200 DDM and tone delete
	Accuracy: ±0.0015 DDM (±1.5 µA) ±3% of setting ≤+10 dBm output level)
Variable	Range: ±0.4 in 0.001 DDM steps
	Accuracy: ±0.0025 DDM (±2.5 µA) ±3% of setting ≤+10 dBm output level)
Variable Sweep (Available only in dual and tri-modes)	Range: 0 to ±30 µA
	Sweep Rates: 5 to 40 sec
	Step Size: 5 sec
	Accuracy: ±0.5 sec/sweep
Phase Shift	Range: 0 to 120 degrees in 5 degree increments (150 Hz phase relative to 90 Hz)
	Accuracy: ±0.5°

G/S Mode

Tone Frequency Accuracy	
90 Hz	±0.02%
150 Hz	±0.02%
Modulation	
CAL	90 and 150 Hz Tones: 40% AM, each tone
Accuracy	±2% modulation
Variable	Range: 0% to 50% AM (90 and 150 Hz tones)
	Distortion : <2.5% in CAL position
G/S DDM	
Fixed	Range: ±0, 0.091, 0.175, or 0.400 DDM and tone delete
	Accuracy: ±0.003 DDM (±2.5 µA) ±3% of setting ≤ +10 dBm output level)
Variable	Range: ±0.8 DDM in 0.001 DDM steps
	Accuracy: ±0.0048 DDM (±4.0 µA) ±3% of setting ≤+10 dBm output level
Phase Shift	Range: 0 to 120 degrees in 5 degree increments (150 Hz phase relative to 90 Hz)
	Accuracy: ±0.5°

Marker Mode

Marker Tone Frequency Accuracy	
400 Hz	±0.02%
1300 Hz	±0.02%
3000 Hz	±0.02%
Modulation	
CAL	Setting: 95% AM
	Accuracy: ±5% modulation
Variable (single carrier only)	Range: 0% to 95% AM
Distortion	Single Carrier: <2.5% in CAL position (-67 to +10 dBm)
	Tri-Mode: <5% in CAL position

Comm Mode (Comm AM, Comm FM, SSB)

COMM Tone Frequency Accuracy	
Pre-set (AM) 1020 Hz	±0.02%
Pre-set (FM) 1000 Hz	±0.02%
Pre-set (SSB) 1000 Hz / Variable (SSB) 25 to 3000 Hz	±6.25 Hz
Variable Steps (SSB)	25 Hz
AM Modulation	
CAL	1020 Hz tone: 30% AM
	Accuracy: ±2% modulation
Variable	Range: 0% to 95% AM (1% steps)
Distortion	<2.5% in CAL position
FM Modulation	
CAL	1000 Hz tone: 5 KHz deviation
	Accuracy: ±0.5%
Variable	Range: 1 to 15 KHz (1 KHz steps)
Distortion	<5% in CAL position
SSB Modulation	
USB/LSB offset carrier	

SELCAL Mode

Provides amplitude modulation with Selective Calling (SELCAL) tones	
SELCAL Tone Freq Accuracy	± 0.02%
Transmit Modes	Single: single transmission
	Continuous: 7.5 sec interval (typical): 7.5 sec interval (typical)
Modulation	
CAL	Per SELCAL Tone: 40% AM
	Accuracy: ±2% modulation
Variable	Range: 0% to 55% AM
Distortion	<2.5% in CAL position

External Frequency Counter

Frequency Range	
Antenna and RF I/O Connectors	Range: 10 to 400 MHz
	Resolution: 100 Hz
	Accuracy: Same as time base, ±1 count
AUX I/O Connectors	Range: 1 to 10 MHz
	Resolution: 1 Hz
	Accuracy: Same as time base, ±1 count
Sensitivity	
ANT Connector	≥-35 dBm
RF I/O Connector	≥ 0 dBm
AUX I/O Connector	≥1 Vp-p (from a 50 ohm source)

Power Meter (RF I/O Connector)

Frequency Range	
10.0 to 400.0 MHz	
Power Range	
0.1 to <1 W	Resolution 0.01 W
1 to <100 W	Resolution 0.1 W [1]
100 to 1999 W	Resolution 1 W [1]
Accuracy	
<100 MHz	±12% of reading, ±1 count, CW only [2]
100 to 400 MHz	±8% of reading, ±1 count, CW only [2]
Duty Cycle	
≤10 W, continuous	
>10 W to ≤20 W, 3 min on, 2 min off	
>20 W to ≤30 W, 1 min on, 2 min off	

AM Meter

Audio Range	50 to 3000 Hz
Percent Modulation Range	10% to 99%
Accuracy	±10% of reading
Sensitivity	Antenna Connector: ≥ -20 dBm
	RF I/O Connector: ≥ +15 dBm

FM Meter

Audio Range	50 to 3000 Hz
Deviation Range	1 to 15 kHz
Accuracy (156 to 400 MHz)	±(0.4 kHz + 8% of reading)
Minimum Input Level	Antenna Connector: ≥-35 dBm
	RF I/O Connector: ≥0 dBm

1 - External attenuator required for input power greater than 30 W

2 - Accuracy specification excluding external attenuator

SWR Meter (SWR Connector)

Frequency Range	10.0 MHz to 410.0 MHz
Accuracy	SWR <3:1: ±0.2, ±20% of reading
	SWR ≥3:1: ±0.3, ±20% of reading

121.5/243 Beacon Monitor (Option)

Swept Audio Tone Range	100 Hz to 3000 Hz
Accuracy	±10% of reading
Sensitivity	Antenna Connector: ≥-30 dBm
	RF I/O Connector: ≥0 dBm

406 MHZ Beacon Monitor (Option)

Sensitivity	Antenna Connector: ≥-35 dBm
	RF I/O Connector: ≥0 dBm

Inputs/Outputs

RF I/O Connector	
Type	Input/Output
Impedance	50 Ω typical
Maximum Input Level	30 W, 1 min on, 2 min off
VSWR	10 to ≤300 MHz: <1.3:1
	>300 to 400 MHz: <1.35:1
Antenna Connector	
Type	Input/Output
Impedance	50 Ω typical
Maximum Input Level	0.5 W
SWR Connector	
Type	Output
Impedance	50 Ω typical
Maximum Reverse Power	+25 dBm
VSWR	10 to ≤300 MHz: <1.3:1
	>300 to 400 MHz: <1.35:1
AUX Connector	
Type	Input/Output
Impedance	800 Ω typical
Maximum Input Level	5 Vp-p maximum, 3 VDC maximum
Timebase (TCXO)	
Temperature Stability	±1 ppm
Aging	±1 ppm per year
Overall Accuracy	+/- 2.5 ppm
Battery	
Type	Li Ion
Duration	>8 hrs continuous operation

Input Power (Test Set)	
Input Range	11 VDC to 32 VDC
Power Consumption	55 W maximum
	16 W nominal at 18 VDC with charged battery
Fuse Requirements	5 A, 32 VDC, type F
Input Power (Supplied External AC to DC Converter)	
Input Range	100 to 250 VAC, 1.5 A maximum, 47-63 Hz
Main 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 Temperature [3]	-20° to 55°C (-4° to 131°F)
Storage Temperature [4]	-30° to 70°C (131° to 158°F)
Relative Humidity	80% from 5°C to <10°C (41° to <50°F)
	95% from 10°C to <31°C (50° to 87.8°F)
	75% from 31°C to <40°C (87.8° to 104°F)
	45% from 40°C to 50°C (104° to 122°F)
Supplied External AC to DC Converter	
Use	Indoors
Altitude	≤3,000 meters
Temperature	5° to 40°C (41° to 104°F)

Physical Characteristics

Dimensions:	11.2 x 9.1 x 2.7 in (28.5 x 23.1 x 6.9 cm)
Weight	<8 lbs. (3.6 kg), test set only

3 - Battery charging temperature range: 5° to 40°C (controlled by Internal charger)

4 - Li Ion battery must be removed below -20°C and above 60°C

Certifications

Audio distortion characteristics are measured in a 20 Hz to 15 kHz post detection bandwidth. All DDM measurements are made on RF output signal.

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
Relative Humidity	MIL-PRF-28800F Class 2
Shock, Functional	MIL-PRF-28800F Class 2
Vibration Limits	MIL-PRF-28800F Class 2
Temp, operating [5]	MIL-PRF-28800F Class 2
Temp, not operating [6]	MIL-PRF-28800F Class 2
Transit Drop	MIL-PRF-28800F Class 2
Safety Compliance	UL-61010B-1
	EN 61010-1
	CSA 22.2 No 61010-1
EMC	EN 61326
External AC-DC Converter	
Safety Compliance	UL 1950 DS
	CSA 22.2 No. 234
	VDE EN 60 950
EMI/RFI Compliance	FCC Docket 20780 Curve "B"
EMC	EN 61326
Transit Case	
Drop Test	FED-STD-101C, Method 5007.1 Paragraph 6.3, Procedure A, Level A
Falling Dart Impact	ATA 300, Category I
Vibration, Loose Cargo	FED-STD-101C, Method 5019
Vibration, Sweep	ATA 300, Category I
Simulated Rainfall	MIL-STD-810F, Method 506.4 Procedure II of 4.1.2
	FED-STD-101C, Method 5009.1, Sec 6.7.1
Immersion	MIL-STD-810F, Method 512.4

5 - Temperature range extended to -20°C to 55°C.

6 - Temperature range reduced to -30°C to 71°C.

VIAVI Solutions

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