

## Data Sheet

# VIAVI 3550R

## Touch-Screen Radio Test System

### General Specifications

<b>RF Signal Generator</b>	
<b>Frequency</b>	
Range	2 MHz - 1 GHz (usable from 500 kHz)
Resolution	1 Hz
<b>Output Level</b>	
Range	T/R Port: -50 to -125 dBm / 707107 $\mu$ V to 0.126 $\mu$ V ANT Port: -30 to -90 dBm / 7071.068 $\mu$ V to 7.071 $\mu$ V SWR Port: -5 to -65 dBm / 125743.344 $\mu$ V to 125.743 $\mu$ V
Resolution	Step size 0.1 dB
Accuracy	$\pm$ 2 dB; $\pm$ 1.5 dB typical $\pm$ 3 dB (<-100 dBm); $\pm$ 1.5 dB typical
<b>SSB Phase Noise</b>	
-80 dBc / Hz at 20 kHz offset	
-95 dBc / Hz at 1 GHz typical at 20 kHz offset	
<b>Spurious</b>	
Harmonics	-30 dBc, -42 dBc typical
Non-Harmonics	-40 dBc, -50 dBc typical
<b>Residual FM</b>	
<40 Hz in 300 Hz to 3 kHz BW; 6 Hz typical	
<b>Residual AM</b>	
<5% in 300 Hz to 3 kHz BW; 0.65%	
<b>Port Input Protection</b>	
ANT Port	+20 dBm typical
SWR Port	+20 dBm typical
T/R Port	+44 dBm typical
<b>Port VSWR</b>	
ANT Port	<1.5:1
SWR Port	<1.5:1
T/R Port	<1.25:1
<b>FM Modulation (GEN 1 and GEN 2)</b>	
<i>Modulation Frequency Rate</i>	
Range	0 Hz to 20 kHz
Resolution	0.1 Hz

Accuracy	Timebase $\pm$ 2 Hz
<b>FM Modulation</b>	
Range	Off, 0 Hz to 100 kHz
Resolution	1 Hz
Accuracy	$\pm$ 10% (2 kHz to 50 kHz deviation, 150 Hz to 3 kHz rate) Typically <4% (5.6 kHz deviation, 1 kHz rate)
Total Harmonics Distortion	3%, 1% typical (1 kHz rate, >2 kHz deviation, 300 Hz - 3 kHz BP filter)
<b>External FM Modulation</b>	
<i>Microphone In</i>	
Input Range	Range 1: 2-15 mVrms (8 mVrms nominal) MIC E-OPEN, F-GND Range 2: 35-350 mVrms (100 mVrms nominal) MIC E-GND, F-OPEN Range 3: 2-32 mVrms (20 mVrms nominal) MIC E-OPEN, F-OPEN
Frequency Range	300 Hz to 3 kHz
Deviation Range	Off, 0 Hz to 80 kHz
Modulation Accuracy	$\pm$ 20% (300 Hz to 1.2 kHz) $\pm$ 30% (>1.2 kHz)
Slope	Positive voltage yields positive deviation
<i>Audio In</i>	
Switchable Loads	150 ohms, 600 ohms, 1 K ohms, High-Z DIV 10 (1 K ohms, 30 Vrms maximum input)
Input Levels	0.05 to 3 Vrms
Frequency Range	300 Hz to 5 kHz
Level Sensitivity	1 kHz / 35 mVrms
Slope	Positive voltage yields positive deviation
<b>AM Modulation (GEN 1 and GEN 2)</b>	
<i>Modulation Frequency Rate</i>	
Range	0 Hz to 20 kHz
Resolution	0.1 Hz

<i>Modulation Frequency Rate - Continued</i>	
Accuracy	Timebase $\pm 2$ Hz
<i>AM Modulation</i>	
Range	Off, 0 to 100%
Resolution	0.1%
Modulation Accuracy	10% off setting, 150 Hz to 5 kHz rate, 10% to 90% modulation (based on $\pm$ peak / 2 measurement)
Total Harmonics Distortion	3% (20% to 90% mod, 1 kHz rate, 300 Hz to 3 kHz BP filter)

#### **External AM Modulation**

##### *Microphone IN*

Input Range	Range 1: 2-15 mVrms (8 mVrms nominal) MIC E-OPEN, F-GND Range 2: 35-350 mVrms (100 mVrms nominal) MIC E-GND, F-OPEN Range 3: 2-32 mVrms (20 mVrms nominal) MIC E-OPEN, F-OPEN
Frequency Range	300 Hz to 3 kHz
Modulation Range	0% to 80%

##### *Audio IN*

Switchable Loads	150 ohms, 600 ohms, 1 K ohms, High-Z DIV 10 (1 K ohm, 30 Vrms maximum input)
Input Levels	0.05 to 3 Vrms
Frequency Range	300 Hz to 5 kHz
Level Sensitivity	1% / 35 mVrms nominal

#### **AFGEN 1 and AFGEN 2**

##### *Frequency*

Range	30 Hz to 5 kHz (spec) 0.0 Hz to 20.0 kHz (usable)
Resolution	0.1 Hz
Accuracy	Timebase $\pm 2$ Hz

##### *Output Level*

Range	0 to 1.57 Vrms (into 600 $\Omega$ )
Resolution	0.01 Vrms
Accuracy	$\pm 10\%$ ; Typical 3%
Distortion	3% (1 kHz rate, sine, 300 Hz to 3 kHz); 1% typical

#### **RF Receiver**

##### *Frequency*

Range	2 MHz to 1 GHz (usable from 750 kHz)
Resolution	1 Hz
Accuracy	Same as timebase

##### *Input Amplitude*

Minimum Input Level, Audio Sensitivity	ANT: -80 dBm (22.4 $\mu$ V), typical 10 dB SINAD (-110 dBm with preamp) T/R: -40 dBm (2236 $\mu$ V), typical, 10 dB SINAD
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Usable Input Level Range	ANT: -60 dBm (-80 dBm with RF Amp On) to -10 dBm (RF Error, Distortion, Modulation, AF Counter and AF Level) ANT: -90 dBm (-110 dBm with RF Amp On) to -10 dBm (RSSI) T/R: -20 dBm (RF Error, Distortion, Modulation, AF Counter and AF Level) T/R: -50 dBm to maximum input level (RSSI)
Maximum Input Level	ANT: +20 dBm / 0.1 W for 10 seconds T/R: +43 dBm / 20 W (FM) and +37 dBm (AM) +47 dBm / 50 W (FM) and +41 dBm (AM) with 50 W attenuator +51.76 dBm / 150 W (FM) and 45.76 dBm (AM) with 150 W attenuator

#### **AM / FM Demodulation**

IF Bandwidth	FM: 5 kHz, 6.25 kHz, 8.33 kHz, 10 kHz, 12.5 kHz, 25 kHz, 30 kHz, 100 kHz, 300 kHz AM: 5 kHz, 6.25 kHz, 8.33 kHz, 10 kHz, 12.5 kHz, 25 kHz, 30 kHz
Audio Filters Bandwidth	0.3-20 kBP, 0.3-5 kBP, 0.3-3 kBP, 0.3 kHP, CCITT BP, C-Wt BP, 15 K LP, 5 K LP, 3 K LP, 0.3 K LP, 0.02 kHP, 0.02-3 kBP, 0.02-5 kBP
Audio Output Level Sensitivity	FM: (3 Vrms / kHz Dev) * IF BW (kHz) $\pm 15\%$ AM: 7 mVrms / % AM $\pm 15\%$
Speaker Output	75 dBA min at 0.5 m, 600 - 1800 Hz, max volume)

##### *Volume Control*

Range	0 to 100
LO EMISSIONS	>-50 dBc

#### **RF Frequency Error Meter**

Range	$\pm 200$ kHz
Resolution	1 Hz
Accuracy	Timebase $\pm 2$ Hz

#### **RSSI Indicator (RF Power Within Receiver IF Bandwidth)**

Display Range	dBm: -120 dBm to +43 dBm (+53 dBm with Ext Attn dB set to 20 dB) Watts: 10 pW to 20 W (200 W with Ext Attn dB set to 20 dB)
Usable Meter Reading RF Level Range	T/R Port: -50 dBm to +43 dBm ANT Port (without RF amp on): -90 dBm to -10 dBm ANT Port (with RF amp on): -110 dBm to -10 dBm
Resolution	0.01 dBm
Accuracy	$\pm 3$ dB; 1.5 dB typical (>-50 dBm into T/R, >-90 dBm into ANT or >-110 dBm into ANT with RF Amp On)

#### **RF Power Meter (Broadband RF Power Into T/R Port)**

Display Range	0 to 43 dBm (0 to 20 W)
Minimum Input Level	0.10 W / +20 dBm
Maximum Input Level	20 W / 43 dBm for 10 minutes at +25° C or until thermal alarm sounds
Resolution	0.01 W / 0.1 dBm
Accuracy	$\pm 1$ dB; 0.5 dB typical

<b>FM Deviation Meter</b>	
Range	500 Hz to $\pm 100$ kHz
Modes	Peak+, Peak-, (Peak+ - Peak-) / 2 RMS, dBr
Resolution	0.1 Hz
Accuracy	$\pm 10\%$ , 6% typical; of reading 500 Hz to 100 kHz deviation $\pm 5\%$ , 4% typical 1 kHz to 10 kHz deviation, 150 Hz and 1 kHz rate

<b>AM Percent Meter</b>	
Range	5% to 100%
Modes	Peak+, Peak-, (Peak+ - Peak-) / 2 RMS, dBr
Resolution	1%
Accuracy	$\pm 5\%$ of reading, 1 kHz rate, 30% to 90% modulation, 3 kHz LPF; 2% typical

<b>Ant-Cable Test</b>	
Frequency Range	2.0 MHz to 1000.0 MHz
Span Range	10.0 MHz to 998 MHz
Start Range	2.0 MHz to 990.0 MHz
Stop Range	12.0 MHz to 1000.0 MHz
Frequency Resolution	0.1 MHz
Markers	6
Immunity to Interfering Signal	Typically -30 dBm

<b>SWR Measurement</b>	
VSWR Range	1.00 to 20.00
Resolution	0.01
VSWR Accuracy	$\pm 20\%$ of SWR readings (calibrated) <300 MHz; typical $\pm 30\%$ of SWR readings (calibrated) $\geq 300$ MHz; typical

<b>Return Loss (RL) Measurement</b>	
Range	0.0 to -50.0 dB
Resolution	0.01 dB

<b>Cable Loss Measurement</b>	
Range	0.0 to -50.0 dB
Resolution	0.01 dB

<b>DTF Measurement</b>	
Measurement Range	3 ft to 328 ft 1 m to 100 m
Return Loss Bridge	0.0 to -50.0 dB
Cable Types	USER, RG-8x, RG-8, RG-8foam, RF-8A, RF-55, RF-55A, RF55B, RG-58, RG-58foam, RG-58A, RG-58B, RG-58C, RG-174, RG-213, RG-214, RG-223, RG-400
Velocity	0.00 to 1.00, automatically selected to cable type
Loss	0.00 to 100.00 dB per 100 ft, automatically selected by cable type
Est Length	40, 80, 200 or 400 ft 12.2, 24.4, 61 or 121.9 m

<b>Audio Meters</b>	
<i>Audio Input (Audio IN)</i>	
Source	BNC, Input on front panel
Frequency Range	300 Hz to 10 kHz
Level Range	0.2 Vp-p to 5 Vp-p

<b>SINAD Meter (with 1 kHz Audio)</b>	
Measurement Sources	Audio in, demod
Audio Frequency	1 kHz
Display Range	0 to 40 dB
Resolution	0.1 dB
Accuracy	$\pm 1.5$ dB from 8 to 40 dB; $\pm 1.0$ dB typical

<b>Distortion Meter</b>	
Measurement Sources	Audio in, demod
Audio Frequency	1 kHz
Reading Range	0% to 100%
Resolution	0.1%
Accuracy	$\pm 10$ from 1% to 20%; $\pm 1$ count

<b>Audio Frequency Counter</b>	
Input Demodulation Range	FM: 15 Hz to 20 kHz (IF BW set appropriately for received modulation BW) AM: 100 Hz to 10 kHz (IF BW set appropriately for received modulation BW) Audio Input Level: 10 mVp-p to 5 Vp-p
Audio Input Range	15 Hz to 20 kHz
Ext Audio Input	10 mVp-p to 5 Vp-p
Resolution	0.1 Hz
Accuracy	$\pm 1$ Hz

<b>Audio Frequency Level Meter</b>	
Measurement Sources	Audio in, DVM
Frequency Range	200 Hz to <5 kHz
Input Level	Audio in 10 mV rms to 3 V rms (x1) 1 V rms to 30 V rms (/10) DVM 10 mV rms to 3 V rms (x1) 1 V rms to 30 V rms (/20)
Display Unit Resolution	Volts 0.001 V mV 0.001 mV dBuV 0.001 dBuV dBm 0.001 dBm Watts 0.001 W
Accuracy	$\pm 5\%$ ; $\pm 2\%$ typical; Audio In

<b>Channel Analyzer (Optional)</b>	
<b>Frequency</b>	
Range	2 MHz to 1 GHz (Usable from 250 kHz)
Resolution	1 Hz
Accuracy	Same as timebase

<b>Frequency - Continued</b>	
Span	10 kHz to 5 MHz in 1, 2, 5 sequence
Wide Analyzer	10 kHz to 50 MHz in 1, 2, 5 sequence
<b>Effective RBW</b>	
Range	19 Hz to 25 kHz (Effective RBW calculated based on FFT window type and Span)
<b>Power Bandwidth</b>	
Offset Range	0 to $\pm 2.495$ MHz
Bandwidth Range	1 kHz to 5 MHz in a 1, 2, 5 sequence (maximum bandwidth is the selective span)
Power Bandwidth Display Range	-137 dBm to +43 dBm
Power Bandwidth Display Resolution	0.001 dBm
Power Bandwidth Accuracy	$\pm 3$ dB (>-50 dBm into T/R, >-90 dBm into ANT or >-110 dBm into ANT with RF Amp On)
Markers	6
Displayed Average Noise Level (DANL)	-120 dBm (typical, 10 kHz span) -14 dBm with pre-amp enabled
<b>Oscilloscope (Optional)</b>	
Source	DVM, Audio In, Demod
Traces	One
Markers	Six
Maximum Input Level	+30 Vrms
<b>Trigger</b>	
Type	Auto, Norm
Edge	Rising, Falling
Trigger Level Range	-30 to +30 Vrms
Horizontal Range	0.5 ms / div to 0.1 sec / div
Accuracy	3% of full scale
<b>Vertical Range</b>	
FM demod	0.1 kHz to 50 kHz / div in a 1, 2, 5 sequence
AM demod	5, 10, 20, 50% / div
DVM and Audio in	10 mV to 10 V / div in a 1, 2, 5 sequence
Accuracy	10% of full scale
Coupling	DVM Input: AC, DC and GND Audio in: AC
Input Impedance	DVM Input: 1 M $\Omega$ Audio in: 150 $\Omega$ , 600 $\Omega$ , 1 K $\Omega$ , High-Z, Div by 10
Bandwidth	5 kHz
<b>Occupied Bandwidth (Optional) (Requires Channel Analyzer Option)</b>	
<b>Frequency</b>	
Range	2 MHz to 1 GHz (Usable from 250 kHz)

<b>Bandwidth Measurement Range</b>	
Percentile	1.0% to 100%, selectable in 0.1% steps
<b>OBW Display</b>	
Span Range	10 kHz, 20 kHz, 50 kHz, 100 kHz, 200 kHz, 500 kHz, 1 MHz, 2 MHz, and 5 MHz; selectable
OBW Power Resolution	0.01 dB
OBW Frequency Resolution	1 Hz (step size = span range / 128)
<b>Accuracy</b>	
OBW Power	$\pm 3$ dB ( $\pm 1.5$ dB typical)
OBW Frequency	$\pm 1\%$ of span range (Hanning window selected)
Modes	Live
<b>Timebase</b>	
Temperature Stability	$\pm 0.15$ ppm at -20° C to 70° C
Aging	0.5 ppm / First Year 0.3 ppm / After First Year
Warm-up Time	3 min
<b>Environmental / Physical</b>	
Overall Dimensions	231 mm x 285 mm x 70 mm (W X L X D) 9.1 in x 11.2 in x 2.8 in
Weight	8.3 lbs (3.75 kg); 12 lbs (5.4 kg) with accessories
Temperature	Storage: 5° C to +71° C storage <b>Note: Battery must not be subjected to temperatures below -20° C, nor above +60° C</b>
Operation	3550R - DC only Operation: -20° C to +55° C (battery removed, contingent upon applied RF power over time). 3550R Battery Operation: -20° C to +40° C (typical based on internal temperature rise and usage of the instrument). <b>Note: Battery to be charged as temperature between 0° C to +45° C</b>
Altitude	4600 M - MIL-PRF-28800F Class 2
Humidity	95% Maximum (Non-condensing) MIL-PRF-28800F Class 2
Shock, Functional	30 G - MIL-PRF-28800F Class 2
Bench Handling	MIL-PRF-28800F Class 2
Vibration	MIL-PRF-28800F Class 2
<b>AC Input Power (AC to DC Converter / Charger Unit)</b>	
AC Input Voltage Range	100 to 240 VAC, 1.5 A max, 47 Hz - 63 Hz
Operating Temperature	0° C to +40° C
Storage Temperature	-20° C to +85° C
EMI	EN55022 Class B, EN61000-3-2 Class D
Safety	UL 1950, CSA 22.2 No. 234 and No. 950, IEC 950 / EN 60950

DC Input Power	
DC Input Voltage Range (DC INPUT CONNECTOR)	11 VDC to 32 VDC
DC Power Input, Max (DC INPUT CONNECTOR)	55 W
DC Power Input, Nominal (DC INPUT CONNECTOR)	25 W
DC Fuse Requirement (DC INPUT CONNECTOR)	5 A, 32 VDC, Type F

Battery	
Battery Type	Lithium Ion (Li Ion) battery pack <b>Note: Battery must not be subjected to temperatures below -20° C, nor above +60° C</b>
Battery Operation Time	100% Backlight: 3 1/2 hours typical 40% Backlight: 4 hours typical Minimum Backlight: 4 1/2 hours typical
Battery Charge Time	4 hours <b>Note: Battery to be charged at temperatures between 0° C and +45° C only</b>

## Compliance

EMC	
Emissions	MIL-PRF-28800F EN61326: 1998 Class A EN61000-3-2 EN61000-3-3
Immunity	MIL-PRF-28800F EN61326: 1998

Safety	
Standard	UL 61010-1, CSA

Environmental	
Acoustic Noise	MIL-PRF-28800F Class 2
Explosive Atmosphere	MIL-PRF-28800F Class 2
Dust Resistance	MIL-PRF-28800F Class 2
Drip Proof	MIL-PRF-28800F Class 2
Blowing Rain	MIL-PRF-28800F Class 2
Solar Radiation	MIL-PRF-28800F Class 2

1. "Specifications" describe product performance over the specified operating temperature range and frequency range are covered by the product warranty. "Typical" numbers are specified at ambient, room temperature (23° C) and describes a characteristic that 95% of product exhibit ( $\pm 2$  standard deviations) with a 95% confidence level at room temperature (23° C). Typical characteristics are not covered by product warranty.

2. Use reason when working with RF test instruments. All thermal ratings are dependent upon applied RF power. The 3550R will alarm once the internal temperature of the 3550R exceeds predetermined limits. Applying power continuously in high ambient temperature conditions will result in a heat build-up within any instrument. The 3550R is rated for (43 dBm) for 10 minutes at +25° C or until thermal alarm sounds. Exceeding these conditions will result in thermal shutdown.

## Ordering Information

### Versions and Options

Order Number	Description
90849	3550R Handheld 1 GHz Radio Test System (Ruggedized)

#### Standard Accessories

External DC Power Supply
Opt01 Channel Analyzer
Opt02 Oscilloscope

#### Options

83346	35XXOPT07 P25 Test
83347	35XXOPT08 Tracking Generator
89509	35XXOPT09 dPMR Test
89510	35XXOPT10 ARIB T98 Test
92468	3550OPT13 AAR Channel Plan
92803	3550OPT14 Internal Bird 5017D Wideband Power Sensor
112401	3550OPT15 Occupied Bandwidth (Requires 3550OPT01)
114327	3550OPT16 Positive Train Control
142130	TETRA Base Station Test
89261	35XXOPT33 NXDN Test
89262	35XXOPT34 DMR Test

#### Languages

91830	Arabic
91827	Simplified Chinese
91828	Traditional Chinese
92240	French
91820	German
91821	Japanese
91822	Korean
91823	Malay / Indonesian
91824	Polish
91826	Russian
91829	Spanish

#### Regional Kits

##### Accessories Supplied with 3550 Regional Kits

Power Cable (AC)
Handset
Short-Open-Load VSWR Calibrator
Cable (TNC) (M-M) (48 in)
Cable (BNC) (M-M) (48 in) Qty 2

	Adapter (BNC-F to TNC-M) Qty 5
	Fuse, Spare (5 A, 32 Vdc, Type F) Qty 2
	Case, Accessory
	Power Cable (DC cigarette lighter)
	Antenna (BNC) (800 MHz)
	Antenna (BNC) (150 MHz)
	Antenna (BNC) (450 MHz)
	Antenna (BNC) (50 MHz)
	Combo Stand and Cover
90603	3550 US Regional Kit with Black Hard Transit Case + Accessories; US Plug
92777	3550 US Regional Kit with Soft-Sided Carrying Case + Accessories; US Plug
90890	3550 China Regional Kit with Black Hard Transit Case + Accessories; China Plug
92775	3550 China Regional Kit with Soft-Sided Carrying Case + Accessories; China Plug
90889	3550 International Regional Kit with Black Hard Transit Case + Accessories; International Universal Plug
92776	3550 International Regional Kit with Soft-Sided Carrying Case + Accessories; International Universal Plug

#### Optional Accessories

91600	Case, Hard Transit, Yellow
91706	Case, Hard Transit, Black
10192	AC27004 Case, Soft-Sided Carrying
91679	3550 Combo Stand and Cover
67474	AC0826 Tripod
82553	AC24006 Tripod, Dolly, Stand

67076	AC27005 Battery, Spare, Internal
82557	AC5060 Attenuator (10 dB / 150 W), 1.5 GHz
82559	AC27002 Attenuator (20 dB / 50 W), Adapter (N-F to BNC-F), Adapter (N-M to TNC-M)
82560	AC27003 Attenuator (20 dB / 150 W), Adapter (N-F to BNC-F), Adapter (N-M to BNC-F)
112681	3550 Mounting Bracket for 150 W Attenuator (82560)
92723	3550 Accessory Kit, Precision DTF / VSWR
92793	Bird 5017D Wideband Power Sensor
140747	NEON Signal Mapper Package - Tracking Unit, Software and 1 Year License
140748	NEON Signal Mapper Package - Tracking Unit, Software, and 2 Year License
140749	NEON Signal Mapper Package - Tracking Unit, Software, and 3 Year License
141586	NEON Signal Mapper Package - Tracking Unit, Software, and 5 Year License
63927	AC25081 Survey Technologies Inc. (STI) Site Survey Package (Software & GPS Antenna)

#### Extended Warranties

84341	3550 1 Year Extended Hardware Warranty + ANSI No-Cert Calibrations
84342	3550 1 Year Extended Hardware Warranty + Certified Calibrations
84343	3550 3 Year Extended Hardware Warranty + ANSI No-Cert Calibrations
84344	3550 3 Year Extended Hardware Warranty + Certified Calibrations

#### Calibration Certificates

91832	3550 Calibration Certificate
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