

Product Brief

# VIAMI

## 3515 Series

### Portable Radio Communications Test Set

The VIAMI Solutions 3515 is a first-line radio test set designed to verify that portable radios, man-pack radios, vehicle, and aircraft radios are mission ready. The 3515 includes the instruments and features needed to solve field testing problems for modern radios, including digital radios.

This powerful and expandable test set offers optional capabilities to automate test applications, a spectrum analyzer for signal monitoring and an oscilloscope for audio signal analysis.



#### Features

- Lightweight and portable at 8 pounds
- Meets MIL-PRF-28800F, Class II environmental specifications
- Automated test applications guide novice users through the radio test process, step-by-step
- Includes the instrumentation and testing functionality needed for testing antennas, coax cables, transmitters, receivers, and audio system
- Over-the-air radio testing
- Standard instruments included in the 3515:
  - RF Signal Generator
  - RF Receiver
  - Modulation Meters
  - SINAD/Distortion Meter
  - Audio Generators
  - RF Power Meters

#### Benefits

- Reduces "No Fault Found" cost
- Reduces test equipment footprint

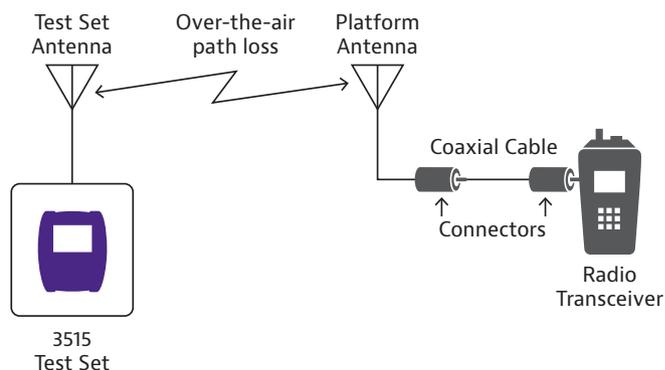
#### Applications

- EPLRS
- SADL
- P25

The 3515 tests the radio in its normal operation mode without having to disconnect any radio components to take measurements. It acts as an external radio and tests through your radios' antenna to perform a complete system operation check.

The 3515 provides detailed and accurate measurements of critical parameters; such as transmit power, frequency error, modulation, and receiver sensitivity to ensure peak radio operation throughout the mission.

Previous generation field testers, such as through-line watt meters and others, require opening the system and "breaking" connections within the radio signal path to insert the tester. This invasive activity requires extra time, causes disruption to deployment activities and is a source for test-induced failures.



VIAMI Solutions understands that in today's market digital communications are just as important as voice communications. The 3515 verifies digital radios over-the-air and non-intrusively. The 3515 supports EPLRS, SADL, and P25 radios.



## Radio Systems and Platform

Below is a partial list of radio systems and models that may be tested with the 3515 Series equipment. Some test require optional testing application scripts and/or accessories. The 3515 performs radio tests without encryption and without COMSEC.

Radio System	In Vehicle Test	In Aircraft Test	Manual Test	Antenna/Coax Test
VHF Ground COMMS (SINGGARS, others)	■	■	■	■
VHF Airborne COMMS		■	■	■
UHF Airborne COMMS		■	■	■
UHF SATCOM/SLOS/BLOS	■	■	■	■
EPLRS/SAD	■	■	■	■
Public Safety/APCO-P25	■	■	■	■
Conventional AM/FM COMMS	■	■	■	■
Audio and Intercom	■	■	■	
Force Protection	■		■	■
Life Support	■	■	■	■
Ground Radio Models	OTA Test	Troubleshooting	Manual Test	Antenna/Coax Test
RT-1523()	■	■	■	■
PRC-117F	■	■	■	■
PRC-148	■	■	■	■
PRC-150	■	■	■	■
PRC-152	■	■	■	■
VRC-103	■	■	■	■
VRC-110	■	■	■	■
Airborne Radio Models	OTA Test	Troubleshooting	Manual Test	Antenna/Coax Test
ARC-164	■	■	■	■
ARC-186	■	■	■	■
ARC-190	■	■	■	■
ARC-201	■	■	■	■
ARC-210	■	■	■	■
ARC-222	■	■	■	■
ARC-231	■	■	■	■
Data Radio Models	OTA Test	Troubleshooting	Manual Test	Antenna/Coax Test
RT-1720G (EPLRS/SADL)	■	■	■	■
RT-1922 (EPLRS/SADL)	■	■	■	■



3515ARM

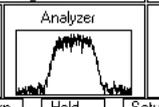
## Easy to Use - Powerful Test Capabilities

As shown below from actual screen displays, the 3515 provides an easy-to-use human interface and powerful radio testing capabilities, including application scripts that reduce or eliminate the learning curve. All the instructions for a test may be put into the application and the test results can be saved for documentation, data, and analysis.

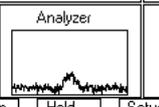
3515A

- 1 · DUPLEX TEST
- 2 · RECEIVER TEST
- 3 · TRANSMITTER TEST
- 4 · ANT-CABLE TEST
- 5 · AUDIO
- 6 · ANALYZER
- 7 · OSCILLOSCOPE
- 8 · TRACK GEN

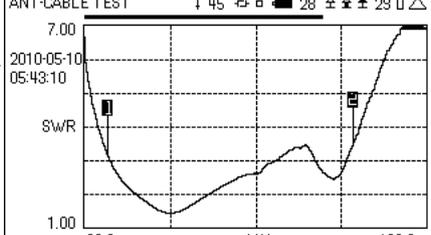
Scripts   Meters   System   Selftest   Util

DUPLEX TEST			
Generator On	Receiver More	Mod-FM Dev 8.110 kHz	
MHz: 55.525000	MHz: 55.525000		
Port: Ant	Port: Ant		
Level: -50 dBm	Mod: FM 25k		
Ext Attn dB: 0	AFBW: None		
Modulator	Freq	FM Group	RSSI
Gen 1: On	900.0 Hz	5.00 kHz	-48.41 dBm
Gen 2: On	150.0 Hz	3.50 kHz	
MIC: Off		2.50 kHz	
Ext Aud: Off	Load: High Z		
Volume: 100	Analyzer		RF Error -0.064 kHz
Squelch: -80 dBm			
Speaker: Demod			
AudOut: Demod			
Save Recall			
Edit	Return	Hold	Setup Ptt off

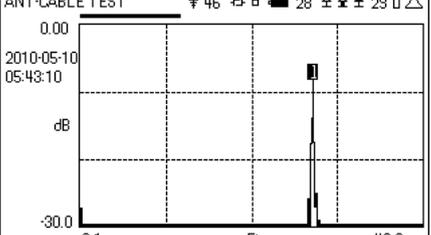
Duplex Screen showing VHF FM radio test

DUPLEX TEST			
Generator On	Receiver More	P25 Demod More	
MHz: 803.775000	MHz: 803.775000	BER 9.7222	
Port: T/R	Port: Ant	Freq Err -71.24	
Level: -110 dBm	Mod: P25	Mod Fdly 20.34	
Ext Attn dB: 0	Deviation 1732.70		
Modulator	P25 Group	RSSI	
Pattern: 1011			
NAC: 293			
Volume: 100	Analyzer		Mod-FM Dev ...
Squelch: -80 dBm			
Speaker: Audio In			
AudOut: Audio In			
Save Recall			
Edit	Return	Hold	Setup Ptt off

Duplex Screen showing a P25 radio test

ANT-CABLE TEST	
2010-05-10 05:43:10	
S <sub>W</sub> R	
	
Marker: 1 On Delta: 1	Pos: 26.67 Delta: 0.00
Move Left Right	VSWR 3.20 Delta: 0.00
Edit	Return Hold Cal Scale

Ant-Cable Test showing a VSWR sweep of a 30 to 90 MHz antenna

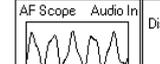
ANT-CABLE TEST	
2010-05-10 05:43:10	
dB	
	
Marker: 1 On Delta: 1	Pos: 27.17 Delta: 0.00
Max Left Right	dB -13.80 Delta: 0.00
Edit	Return Hold Cal Cable

Ant-Cable Test showing a distance measurement of a 27 foot coax

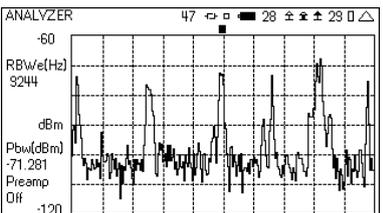
3515A

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- 6 · ANALYZER
- 7 · OSCILLOSCOPE
- 8 · TRACK GEN

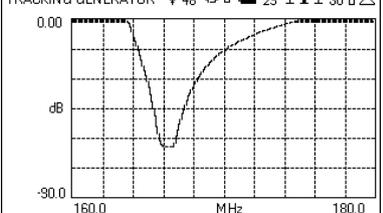
Scripts   Meters   System   Selftest   Util

AF GEN			
Function Generator	Freq	Level	SINAD Audio In
#1: On	1000.0 Hz	1.00 Vrms	12.3 dB
#2: On	2400.0 Hz	0.25 Vrms	
AF Scope Audio In		Distortion Audio In	
		24.3 %	
Volume: 0	Audio Lvl Audio In	AF Cnr Audio In	
Squelch: -50 dBm	1.223 V	1001.0 Hz	
Speaker: Audio In			
AudOut: Fgen			
Save Recall			
Edit	Return	Hold	Setup

Audio Test showing a typical stimulus and response of an audio intercom

ANALYZER	
RBW(Hz)	dBm
9244	-71.281
	
93.8	98.8
Freq (MHz): 96.300000	Span: 5MHz
Preamp: Off	Ref Lvl: -60.0
Edit	Return Hold Norm Marker

Spectrum Analyzer monitoring over the air showing multiple transmitters

TRACKING GENERATOR	
0.00	
dB	
	
160.0	180.0
Freq (MHz): 170.000000	Span (MHz): 20 MHz
Start (MHz): 160.000000	Stop (MHz): 180.000000
Edit	Return Hold Marker

Tracking Generator display of a band-pass filter

Script applications provide extended test capabilities for specific model of radio of specific vehicle or aircraft

## Selected Specifications

RF Signal Generator	
Frequency	2MHz to 1 GHz
Output Level	T/R port: -50 to -120 dBm
	ANT port: -30 to -90 dBm
	SWR port: -5 to -65 dBm
FM Deviation	
Internal Source	Off, 0 Hz to 100 kHz
External	FM Inputs AUDIO GEN, MIC IN, AUDIO IN
AFGEN 1 AND AFGEN 2	
Range	0.0 Hz to 20.0 kHz
RF Receiver	
Frequency Range	2 MHz to 1 GHz
Input Amplitude	Minimum Input Level, Audio Sensitivity T/R: typical, 10 db SINAD - 70dBm ANT: typical 10 dB SINAD (-110 dBm with pre amp)
Maximum Input Level	T/R: +43 dBm ANT: +20 dBm for 10 seconds
RF Frequency Error Meter	
Range	±200 kHz
RSSI Indicator	
Display Range	dBm: -120 dBm to +43 dBm (+53 dBm with Ext Attn)
	Watts: 10pW to 20 W (200 W with Ext Attn)
RF Power Meter	
Display Range	Ext Attn, 0 dBm: 0 to 43 dBm (0 to 20 W ) Ext Attn, 20 dBm: 0 to 53 dBm (0 to 200 W)
Maximum Input Level	No external attenuator 20 W/43 dBm for 10 minutes at +25°C or until thermal alarm
FM Deviation Meter	
Display Range	0 Hz to ±100 kHz
AM Percent Meter	
Display Range	0% to 100%
Antenna/ Cable Test	
Frequency Range	2.0 MHz to 1000.0 MHz
VSWR Range	1.00 to 7.00
Return Loss	
Range	0.0 to -50.0 dB
Cable Loss	
Range	0.0 to -50.0 dB
Distance to Fault Range	3 ft to >300 ft

Audio Meters	
AUDIO INPUT (EXT AUDIN)	
Source	BNC
Frequency Range	300 Hz to 10 kHz
Level Range	0.2 Vp-p to 5 Vp-p
SINAD METER	
Sources	AUDIO IN, DEMOD
Display Range	0 to 40 dB
Distortion Meter	
Sources	AUDION IN, DEMOD
Display Range	0 to 100%
Audio Frequency Counter	
Range	15 Hz to 20 kHz
Audio Frequency Level Meter	
Sources	AUDIO IN, DVM
Input Level	Audio In: 10 mV rms to 30 V rms DVM: 10 mV rms to 30 V rms
Spectrum Analyzer	
Frequency	
Range	2 MHz to 1 GHz
Span	10 kHz to 5 MHz in 1,2,5 sequence
Vertical scales	2, 5, 10, 15, and 20 dB/division
Effective RBW	
Range	20 Hz to 25 kHz
Displayed Average Noise Level (DANL)	-120 dBm (Typical, 10 kHz span) -136 dBm with pre-amp enabled
Oscilloscope	
Source	DVM, Audio In, Demod
Display Level	-50 to +50 V
Horizontal	0.5 ms/div to 0.1 sec/div1
Vertical	10 mV to 10 V per div
Timebase (Standard)	
Temperature Stability	±0.15 ppm
Aging	±500 ppb (year 1) ±300 ppb/year (after year 1)
Warm-up time	5 min.
Audio Frequency Counter	
Range	15 Hz to 20 kHz
Audio Frequency Level Meter	
Sources	AUDIO IN, DVM
Input Level	Audio In: 10 mV rms to 30 V rms DVM: 10 mV rms to 30 V rms
Environmental / Physical	
Overall Dimensions	9.1 x 11.2 x 2.8 in.
Weight	Less than 8 lbs. (3515 unit)

## Selected Specifications continued

Environmental / Temperature	
Storage	-51°C to +71°C storage
External DC Operation	-20°C to +55°C (battery removed, contingent upon applied RF power over time <sup>1</sup> )
Battery Operation	-20°C to +40°C (typical based on internal temperature rise and usage of the instrument <sup>1</sup> ).
Note: Battery to be charged at battery temperatures only between 0°C and +45°C	
Certifications	
MIL-PRF-28800F CLASS 2 for the following:	Humidity, Altitude, Shock, Vibration, Bench Handling, Salt fog, Splash proof, Acoustic noise, Explosive atmosphere, Fungus resistance, Dust resistance, Drip proof, Solar radiation

EMC	
Emissions	Mil-PRF-28800F
	EN61326: 1998 class A
	EN61000-3-2 EN61000-3-3
Immunity	Mil-PRF-28800F
	EN61326: 1998
	EN61000-6-1
Safety	UL61010-1
	Installation Category II
	Pollution degree 2



3515AR

## Configurations, Accessories, Options, and Warranty

The 3515 Series Test Sets are available in several configurations. These different configurations have been made to support customer usage and/or contractual items. Contact VIAVI Solutions if you have questions regarding items within these configurations.

- Included indicates the item is contained within the specified configuration.
- Optional indicates the item is not contained within the specified configuration, but may be purchased as an add-on option.
- Dash ("-") indicates the item is not contained within the configuration and is not available as an option.

## Configuration

Configuration	Description
3515AR	Portable Radio Test Set - AR Configuration (NSN - 6625-01-572-6346)
3515N	Portable Radio Test Set - USMC (Navy) Configuration (NSN - 6625-01-538-0285)
3515ARM	Portable Radio Test Set - ARM Configuration (NSN - 6625-01-617-3401)
3515AR-EP	Portable Radio Test Set - AR-EP Configuration (NSN - 6625-01-618-8588)

## Ordering Information

Equipment	Order Number	NSN	3515AR	3515N	3515ARM	3515 AR-EP
Test Set, 3515AR (Base unit)	3515AR	6625-01-572-6346	Included	-	Included	Included
Test Set, 3515N	3515N	6625-01-538-0285	-	Included	-	-
Flip Cover	63966	6625-01-6218676	Included	Optional	Included	Included

<sup>1</sup> - Consider the use of the instrument for thermal operating temperature. All thermal ratings are dependent upon applied RF power. The 3515 will alarm once the internal temperature exceeds safety limits. Applying power continuously in high ambient temperature environment will result in a heat build-up within the instrument. The 3515 is rated for 20 W (+43 dBm) for 10 minutes at +25° C or until thermal alarm sounds. Exceeding these conditions will result in thermal shutdown.

Accessories	Order Number	NSN	3515AR	3515N	3515ARM	3515 AR-EP
Adapter (BNC-F to TNC-M, qty 5)	23758	5935-00-701-2215 5935-01-552-1849	Included	Included	Included	Included
Adapter (N-F to BNC-F)	23770	5935-01-505-4115	Included	Included	Included	Included
Adapter (N-F to BNC-M)	23769	5935-01-505-4191	Included	Included	Included	Included
Adapter (N-M to BNC-F)	20327	5935-00-821-6126	Included	Included	Included	Included
Adapter (N-M to TNC-M)	23762	5935-01-453-5761	Included	Included	Included	Included
Airborne Adapter Kit	63972		Optional	Optional	Included	Optional
Adapter, TPS-M to BNC-F	86064	5935-00-491-6302	Optional	Optional	Included	Optional
Adapter, TPS-F to BNC-M	86065	5935-00-785-9024	Optional	Optional	Included	Optional
Adapter, BNC-F to BNC-F	86066	5935-01-507-1732	Optional	Optional	Included	Optional
Adapter, HN-F to BNC-M	86067		Optional	Optional	Included	Optional
Adapter, TNC-F to TNC-F	86068	6060-01-569-1025	Optional	Optional	Included	Optional
Adapter, TNC-M to TNC-M	86069	5935-01-544-7750	Optional	Optional	Included	Optional
Cable, ICS to Audio	85893	6625-01-6206316	Optional	Optional	Included	Optional
Cable, H-250 to ICS	85892	6625-01-6206328	Optional	Optional	Included	Optional
Antenna (BNC) (2 to 30 MHz)	9138		Included	Included	Included	Optional
Antenna (BNC) (450 MHz)	9147		Included	Included	Included	Optional
Antenna (TNC) (30 to 90 MHz)	9151		Included	Included	Included	Optional
Antenna (TNC, 30 to 512 MHz, Flex)	88336		Optional	Optional	Optional	Optional
Antenna (TNC, 30 to 512 MHz, 13")	89173		Optional	Optional	Included (Qty. 2)	Included (Qty 2)
Antenna (TNC, 100 to 1000 MHz, 12")	89174		Optional	Optional	Optional	Optional
Attenuator (20 dB/150 W)	38242	5985-01-292-2384	Included	Included	Included	Included
Attenuator (20 dB/50 W)	38240		Included	Included	Included	Included
Battery, Spare	67076		Optional	Optional	Optional	Optional
BER Test Cable	62408		-	Included	-	-
Cable (BNC) (M-M) (48 in, qty 2)	62368		Included	Included	Included	Included
Cable (TNC) (M-M) (48 in)	62398		Included	Included	Included	Included
Case, Accessory 35xx series	91597		Included	Included	Included	Included
Case, Soft-Sided Carrying	10192		Included	Included	-	-
Case, Transit (Pelican)	91600	6625-01-5409690	Optional	Optional	Included	Included
Case Transit, 35XX Series, Black	91706		Optional	Optional	-	Included
Comm Breakout Box	64598	6110-01-572-7127	Included	Included	Included	Included
Desktop, Stand	63656		Optional	Optional	Optional	Optional
Directional Coupler Kit (20 - 200 MHz)	63964		Optional	Optional	Optional	Optional
External DC Power Supply	67374		Included	Included	Included	Included
Fuse (5 A, 32 Vdc, Type F, qty 2)	56080	5920-01-414-6983	Included	Included	Included	Included
Handset (Speaker/Mic)	64606	6625-01-577-5101	Included	Optional	Included	Included
Manual, Getting Started 3515AR (Paper)	6134		Included	-	Included	Included
Manual, Maintenance 3515AR (CD)	6133		Optional	-	Optional	Optional
Manual, Operation/ICW 3515AR (CD)	6132		Included	-	Included	Included
Manual, Getting Started 3515N (Paper)	6126		-	Included	-	-
Manual, Maintenance 3515N (CD)	6118		-	Optional	-	-
Manual, System 3515AR EP (CD)	91921		-	-	-	Included
Manual, Operation/ICW 3515N (CD)	6114		-	Included	-	-

Accessories Continued	Order Number	NSN	3515AR	3515N	3515ARM	3515 AR-EP
Power Cable (DC NATO)	62406		Included	Included	-	-
Power Cables (AC, 3-wire leads)	27516		-	-	-	-
Power Cables (AC, Cont. Europe)	27480		-	-	-	-
Power Cables (AC, N. America)	27478		-	-	-	Included
Power Cables (AC, UK)	27477		-	-	-	-
Power Cable (DC Cigarette Lighter)	62404		-	-	-	Included
Short-Open-Lead Calibrator	38245	6625-01-572-5285	Included	Included	Included	Included
Tripod Dolly Stand	67474 6361 63659		Optional	Optional	Optional	Optional
USB Flash Drive	67327		Included	Included	Included	Included
USMC Documentation	-		-	Included	-	-
USMC Labeling	-		-	Included	-	-
Site Survey Software	63927		Optional	Optional	Optional	Optional
Power Cable (AC)	62302		Included	Included	Included	-

#### Options

Spectrum Analyzer	35XXOPT01		Included	Optional	Included	Included
Oscilloscope	35XXOPT02		Included	Optional	Included	Included
Script Language (includes training info)	3515OPT05		Included	Optional	Included	Included
P25 Test	35XXOPT07		Optional	Optional	Optional	Optional
Tracking Generator	35XXOPT08		Optional	Optional	Optional	Optional
DPMR Test	35XXOPT09		Optional	Optional	Optional	Optional
ARIB T-98 Test	35XXOPT10		Optional	Optional	Optional	Optional
AR Test System	3515AROPT24		Optional	Optional	Included	Optional
PRM-34 Application	3515OPT25		Included	Optional	Included	Optional
NXDN Test	35XXOPT33		Optional	Optional	Optional	Optional
DMR Test	35XXOPT34		Optional	Optional	Optional	Optional

#### Warranty

Standard Warranty, 24 months	-		Included	Included	Included	Included
Extended Warranty, 36 mo w/o cal	84345		Optional	Optional	Optional	Optional
Extended Warranty, 60 mo w/o cal	84347		Optional	Optional	Optional	Optional
Extended Warranty, 36 mo with cal	84346		Optional	Optional	Optional	Optional
Extended Warranty, 60 mo with cal	84348		Optional	Optional	Optional	Optional

#### Export Control and Warning

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