

# S14WI Splitter for Wireless Infrastructure

Technical Product Data

## Features

- Active or Passive Options Available
- Optional Antenna Current Monitor and Alarm
- Optional Antenna DC Bias Select
- Optional Filtered L1 Output
- Pole-mount Environmental Housing Available (IEC 529 level IP55)
- Surge Protection Available (Tested to EN61000-4-5)



## Description

Eliminate the cost of multiple antennas and long cable runs in your wireless base stations! Designed to meet the demanding, high reliability requirements of the wireless infrastructure market, the GPS Source S14WI is a high performance GPS signal splitter. The device can be configured to monitor the GPS antenna current, providing an alarm indication if the antenna is not operating according to spec. The S14WI also features an optional antenna DC bias “Pick-&-Choose” circuit which allows for the active antenna DC input to be applied to any or all of the RF outputs. With this option, one DC voltage will be chosen to power the antenna while the other inputs will be switched to DC loads. If the selected DC bias input should fail, the DC bias will be automatically switched to another DC input so as to ensure an uninterrupted supply to the active antenna. The S14WI may be configured as a passive or an active device, giving the network engineer the flexibility to specify the device gain and port-to-port isolation. The S14WI also features an option for Filtered L1 output that offers excellent selectivity around the L1 band to prevent interference from other high power radio frequency sources, such as cellular transmitter stations. The S14WI offers surge protection on all five ports and in a sealed housing sufficient for many years of operation in external environments.

The GPS Source S14WI can be custom designed to fit your unique infrastructure requirements. Please call, fax, email ([sales@gpssource.com](mailto:sales@gpssource.com)), or visit our website ([www.gpssource.com](http://www.gpssource.com)) for further information on product options & specifications.

**Electrical Specifications, Operating Temperature -40 to 85 °C**

Parameter	Conditions	Min	Typ	Max	Units
Freq. Range	Ant – Any Port, Unused Ports - 50 Ω <sup>(1)</sup>	1.2		1.7	GHz
Gain <sup>(2)</sup> -Amplified (Norm) -Amplified (Hi Iso.)	Ant – Any Port, Unused Ports - 50 Ω <sup>(1)</sup> (Gain may be specified by the customer)	20	21	24	dB
		9	10	11	
Loss-Passive	Ant – Any Port, Unused Ports - 50 Ω <sup>(1)</sup>	7	9.0	9.5	dB
Input/Output SWR	All Ports 50Ω <sup>(1)</sup>		1.3:1	2.0:1	-
Noise Figure- Amplified	Ant – Any Port, Unused Ports - 50 Ω <sup>(1)</sup> , Gain = 20dB			2.0	dB
Selectivity	+/-50MHz, Ant Output		45		dB
Amp. Balance	J1 - J2 , Ant–Any Port, Unused Ports - 50 Ω <sup>(1)</sup>			0.5	dB
Phase Balance	Phase (J1 - J2), Ant – Any Port, Unused Ports - 50 Ω <sup>(1)</sup>			1.0	deg
Delay -Passive -Amplified	Ant – Any Port, Unused Ports - 50 Ω <sup>(1)</sup> , L1			3	ns
				5	
Isolation -Amp/Pass (Norm)  -Amplified (Hi Iso.)	Adjacent Ports: Ant - 50Ω <sup>(1)</sup>	15			dB
	Alternate Ports: Ant - 50Ω <sup>(1)</sup>	21			dB
	Adjacent Ports: Ant - 50Ω <sup>(1)</sup>	35			dB
	Alternate Ports: Ant – 50Ω <sup>(1)</sup>	44			dB
DC IN	DC Input on any RF Output	4		12	VDC
DC Ripple	300 Hz to 1MHz			50	mV <sub>pk-pk</sub>
Device Current	Current Consumption of Active device, excludes Ant. Cur.		18	20	mA
Ant/Thru Current <sup>(3)</sup>	Max source DC current through device			250	mA
Antenna Monitor <sup>(4)</sup>	I <sub>OC</sub>	Range for Open Circuit Threshold	15	75	mA
	I <sub>SC</sub>	Range for Short Circuit Threshold <sup>(5)</sup>	100	180	
Surge Protection	8/20us		4		KA

**Notes:**

- (1). Note that for proper RF performance, the S14WI must have all RF ports terminated into a 50Ohm coaxial cable system or a 50Ohm load.
- (2). Custom gain option available.
- (3). Maximum current available from the DC source through the S14WI when output of S14WI is short circuited.
- (4). Open circuit and Short Circuit Current (I<sub>oc</sub>, I<sub>sc</sub>) may be specified by the customer within the specified range.
- (5). In-rush current shall not exceed 3A or exceed I<sub>sc</sub> for greater than 1ms

**Performance Data**

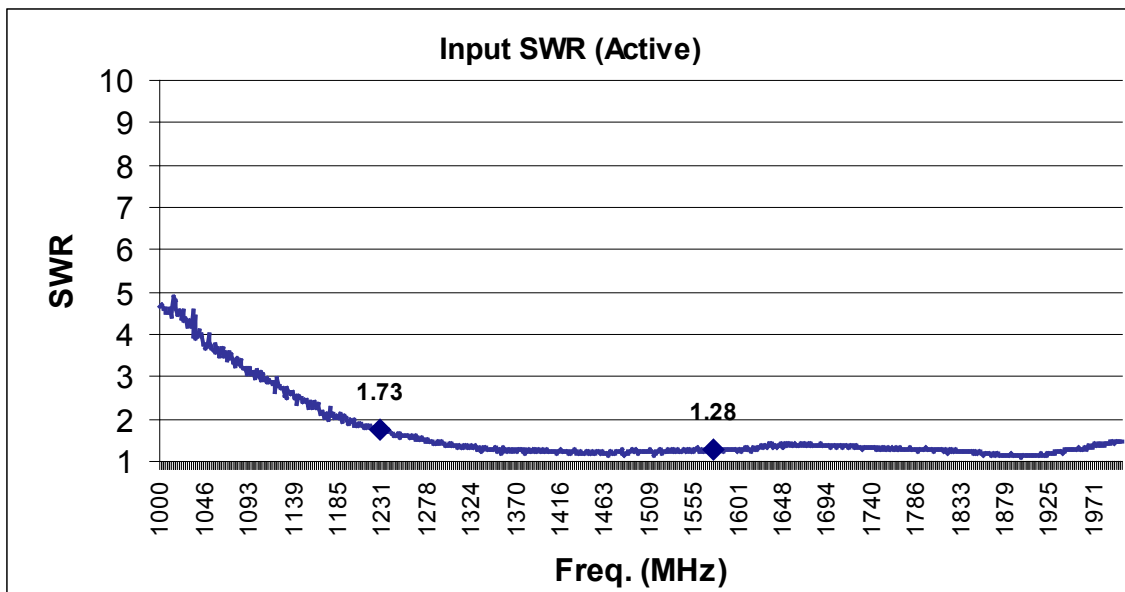
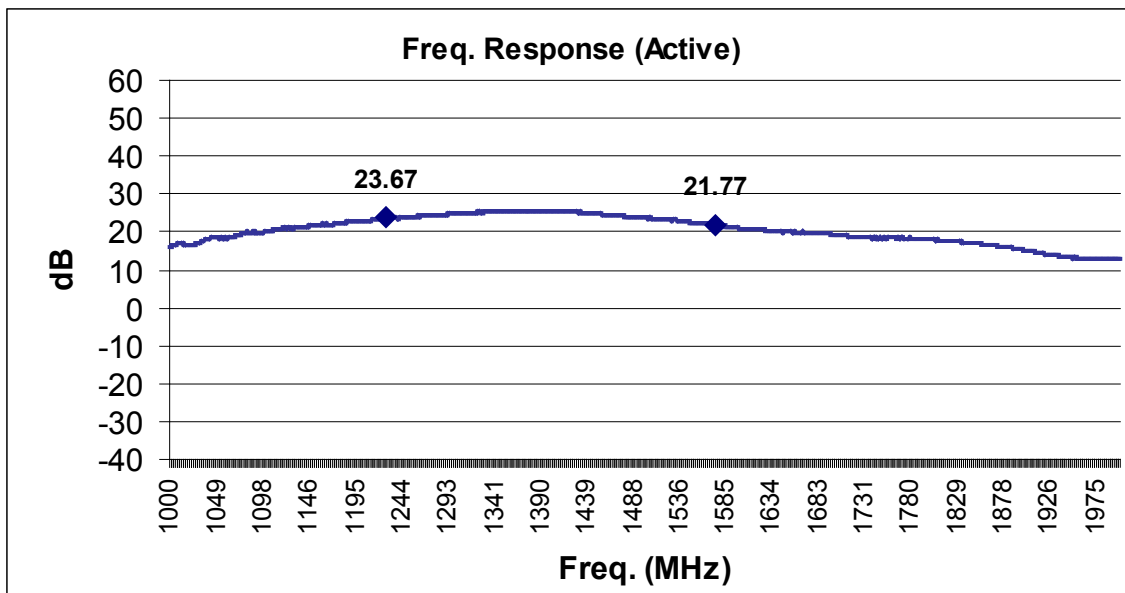


Figure 1. S14WI Active Performance

GPS Source, Inc. reserves the right to change or modify product performance and specifications without prior notification.

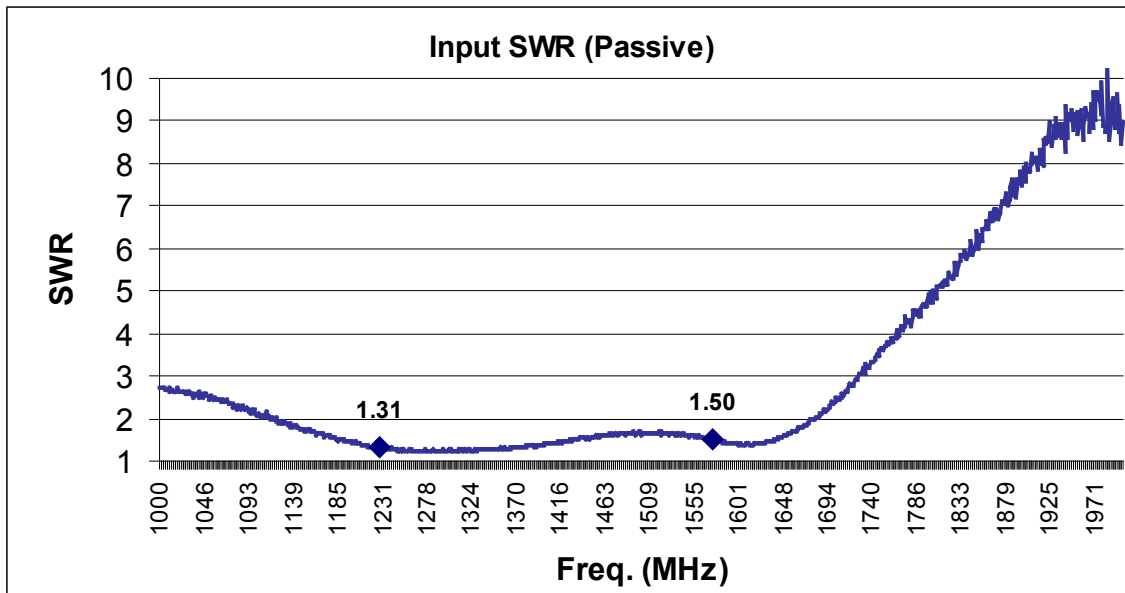
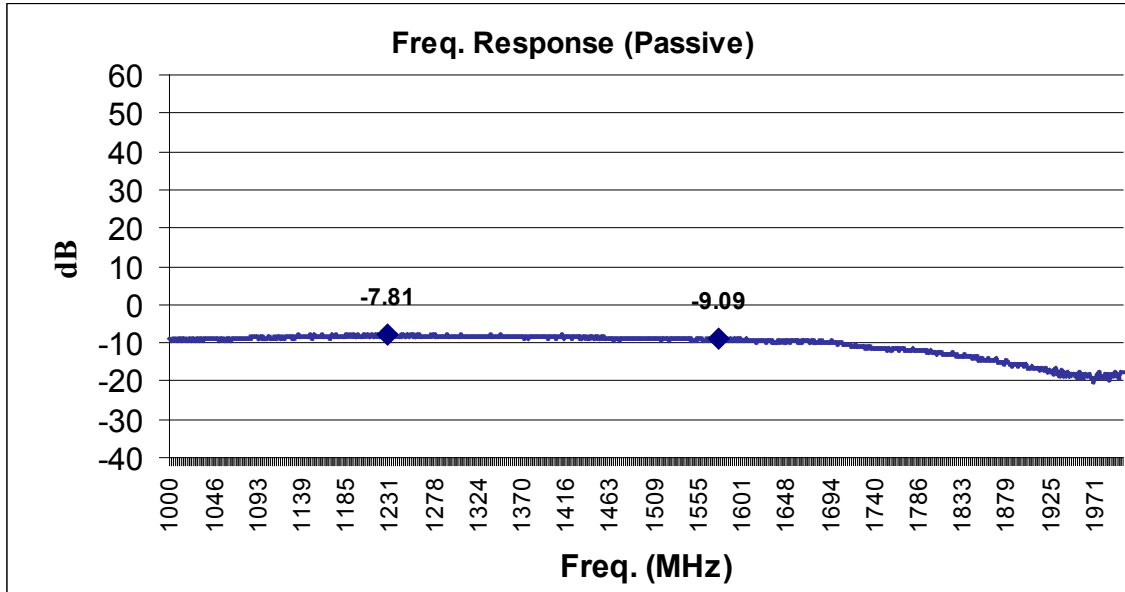


Figure 2. S14WI Passive Performance

GPS Source, Inc. reserves the right to change or modify product performance and specifications without prior notification.

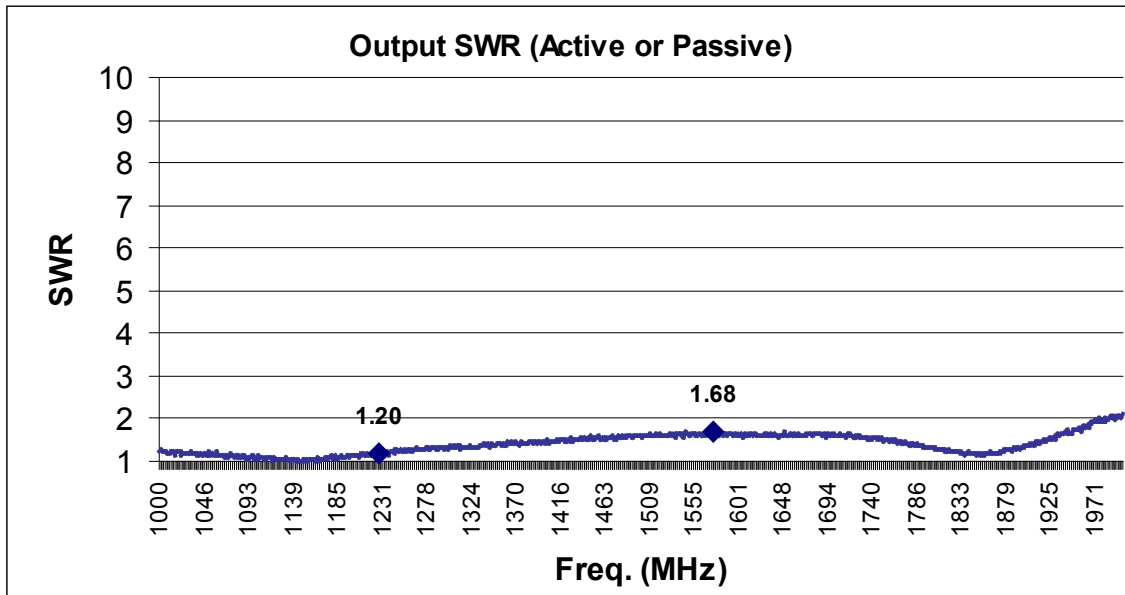
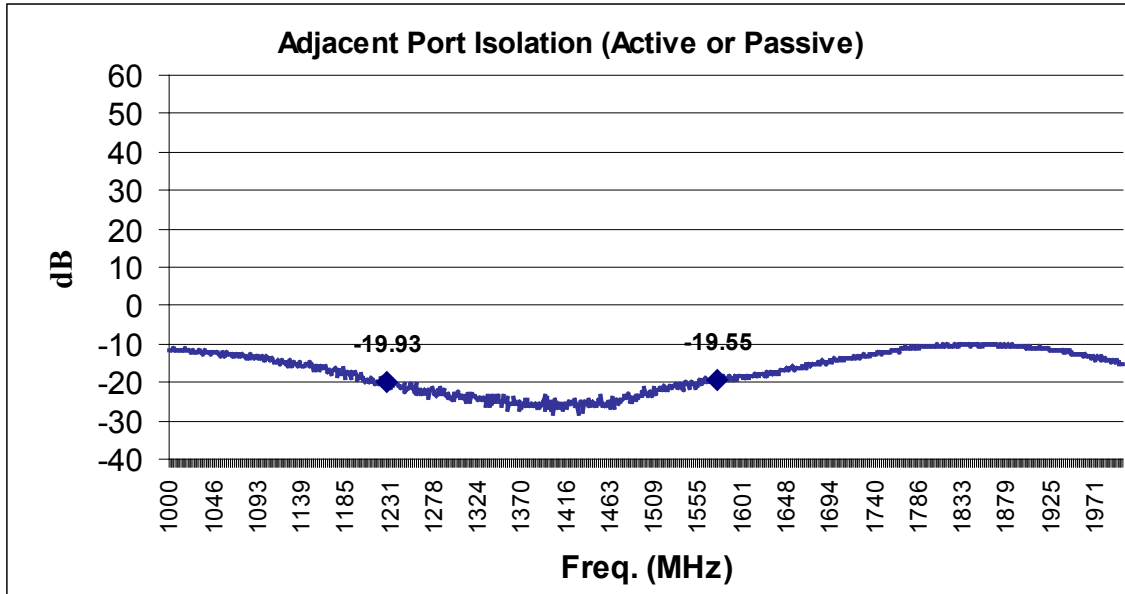


Figure 3. S14WI Active or Passive Output Port Performance

GPS Source, Inc. reserves the right to change or modify product performance and specifications without prior notification.

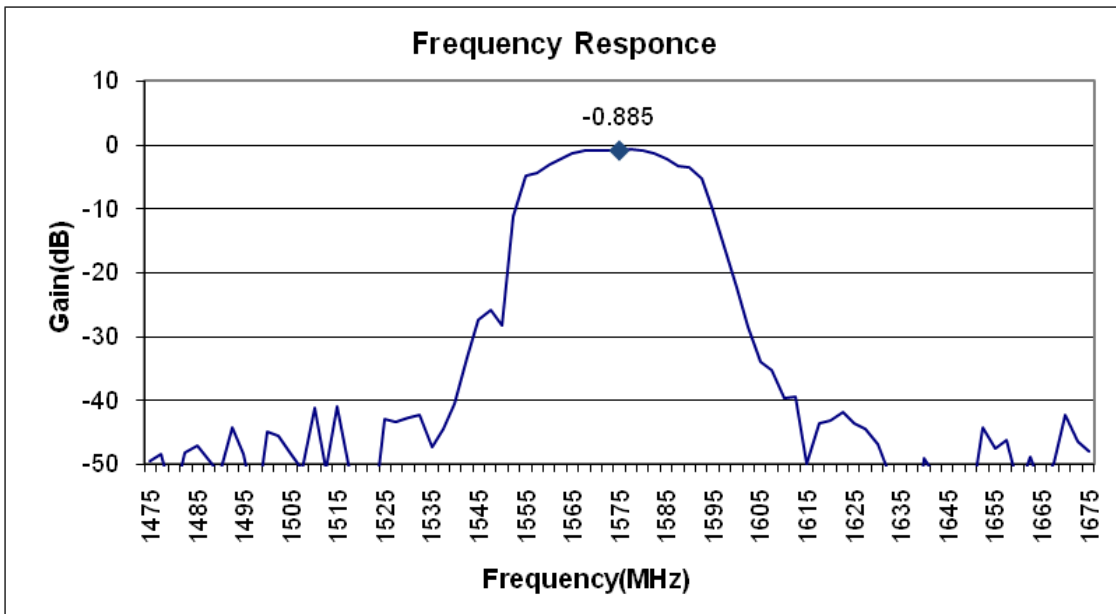
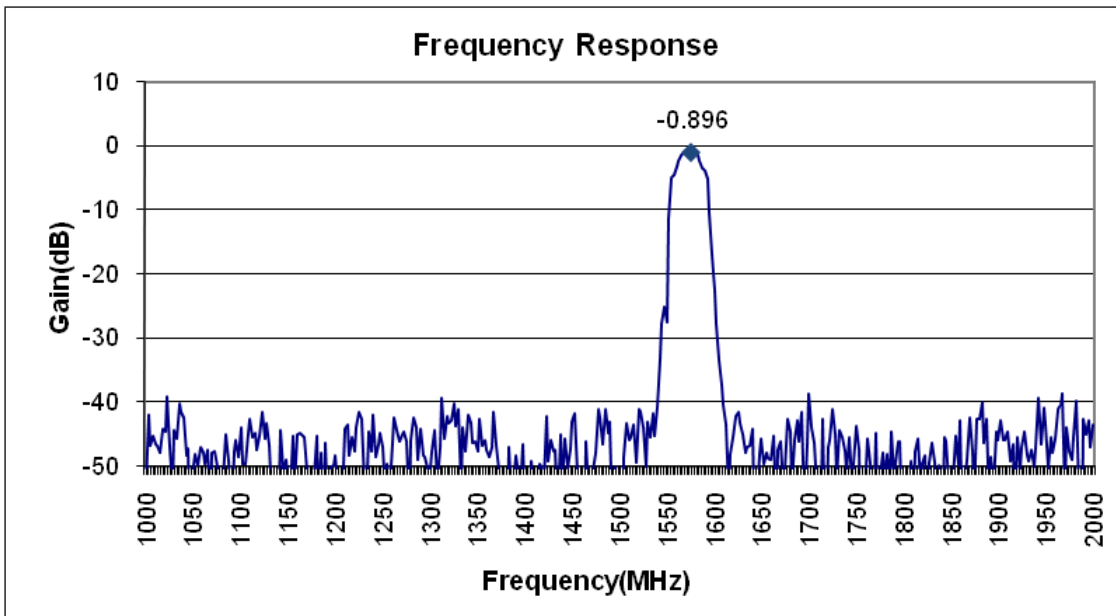


Figure 4. S14WI Output Port Performance (Filtered Option)

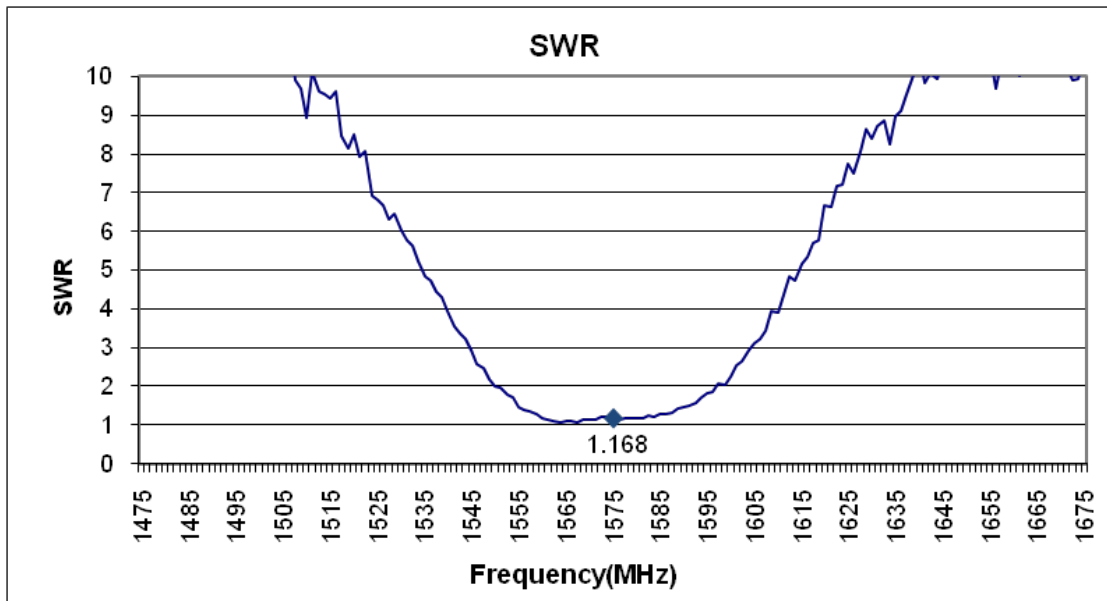


Figure 5. S14WI input SWR Performance (Filtered Option)

## Operational Description

### Antenna DC Bias Select

The S14WI splitter requires that a DC voltage be applied to one or more of the RF output ports by way of the RF connector center conductor. If DC voltages are applied to more than one of the RF output ports, the S14WI pick-&-chose circuit will choose one of these DC inputs to power the active circuitry of the S14WI and will also pass this DC voltage through the splitter to the center conductor of the RF input port. The DC voltage available on the RF input port can then be used to power the application's active antenna. The DC voltages applied to the RF outputs that are not chosen by the pick-&-chose circuitry will be automatically switched through an RF choke to 200Ohm DC loads. The DC voltages may be applied to any or all of the RF outputs; however, the pick-&-chose circuit will always select the DC voltage on the lowest numbered RF port that has a DC voltage applied to power the S14WI and the application's antenna. If the chosen DC input were to be removed or fail, the pick-&-chose circuit will automatically switch to the next higher numbered RF port to which a DC voltage is applied.

The S14WI requires that only one RF output port have an external DC voltage applied (i.e. the device will operate properly even if any one, two, or three ports do not have a DC voltage applied or if a DC voltage is removed from one of the ports). Ports that do not have an external DC voltage applied or from which an external DC voltage is removed are internally pulled down so as to ensure that false input voltage indications do not occur.

*Example:*

Assume DC voltages are applied to RF outputs 1, 3 and 4. In this scenario, the DC voltage on port 1 will be used to power the S14WI and the application antenna. Ports 3 & 4 will be switched to 200Ohm DC loads.

Now assume that the DC voltage on port 1 is removed. The S14WI will automatically terminate the input internally with a pull down resistor and switch operation of the splitter and antenna to the DC voltage applied to the next high numbered port with a DC voltage applied: port 3. Port 4 will remain switched to a 200 Ohm load.

### Antenna Monitor and Alarm

The S14WI includes an option to monitor the status of the application's active antenna and to provide an alarm indication if the antenna's current is not within a specified range. The default current window for the S14WI is 10mA to 150mA (e.g. below 10mA indicates an open circuit, above 150mA indicates a short circuit); however, for large volume orders, the antenna current window may be specified to meet the customer's specific requirements.

The S14WI samples the antenna current 16 times per second. So long as the average of four samples are within the current window, the S14WI will continue to operate normally, passing the DC voltage applied to lowest number RF output on to the RF input. In this mode, DC voltages applied to the remaining RF outputs are switched to 200Ohm DC loads. If the average of four antenna current samples falls outside of the antenna monitor current window, the DC voltage to the antenna is removed (open circuit) and all DC inputs are switch to Pass DC. However, since the DC path to the antenna has been opened, the DC current on all four DC inputs will be at or near zero (less than 0.5mA for the passive configuration and less than 5mA for the active). In this alarm condition, all GPS receivers connected to the RF outputs will also see very low antenna current draw, resulting in corresponding antenna alarm conditions within each receiver.

Once in the alarm condition, the S14WI will periodically (every 60 seconds) attempt to re-connect DC power to the antenna. If the antenna failure condition persists, the S14WI will re-enter the fault condition, repeating this cycle until the fault condition is removed.

### Amplifier and Splitter

The S14WI has the option to be ordered as either a passive device, or to be ordered with amplification. If the amplified option is chosen, additional options are available for specifying the amplifier gain and the port-to-port isolation (see Hi Iso. option in electrical specifications). Amplified versions of the S14WI that also include the High Isolation option do not require 50Ohm termination on unused ports in order for the splitter to operate properly. Passive versions or Amplified versions without the High Isolation option always require 50 Ohm terminations on unused ports for proper operation.





## **Certifications and Approvals**

- EMC/Emissions: FCC part 15B and R&TTE equivalent
- Power Line Surge: IEC-61000-4-5
- Safety/Low Voltage: EN60950-1
- Environmental: IEC 60529, IP55



*Your source for quality GNSS Networking  
Solutions and Design Services, Now!*

*(719) 561-9520*

**Part Number:****S14WI – A – PC – AM – F1 – SF**

Product: \_\_\_\_\_  
1x4 Splitter for Wireless  
(Std: Pass DC J1-Ant, J2, J3, J4 DC Blk.)

Gain Option: \_\_\_\_\_  
**A** – Amplified  
**Axx** – Custom Gain  
**Blank** – Passive  
**H** – Hi Isolation

Pick & Choose Option: \_\_\_\_\_  
**PC** – Add Pick & Choose  
**Blank** – Std. Config.

Antenna Monitor Option: \_\_\_\_\_  
**AM** – Add Ant. Monitor  
**Blank** – Std. Config.

Filtered Option: \_\_\_\_\_  
**Blank** – Std. Config.  
**F1**- L1 Filtered

Connector Options: \_\_\_\_\_  
**NM** – N, Male  
**NF** – N, Female  
**SM** – SMA, Male  
**SF** – SMA, Female  
**TM** – TNC, Male  
**TF** – TNC, Female  
**BM** – BNC, Male  
**BF** – BNC, Female  
**SB** – SMB Jack, Female  
**SC** – SMC Jack, Female  
**MX** – MCX Jack, Female

For help in creating the part number to meet your exact needs, contact us at [Sales@gpssource.com](mailto:Sales@gpssource.com) or visit our website at [www.gpssource.com](http://www.gpssource.com) .

**Mechanical**

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	002	ADDED LABEL	11JULY2006	RH

GROUND LUG SHOWN FOR ILLUSTRATION NOT INCLUDED IN SHIPPED ASM

NO PAINT (MASK) – ALL 5 CONNECTORS SEE NOTE 3

4X  $\phi$ .18 [2.4 mm]

2.15 [54.8 mm]

5.10 [129.5 mm]

M6x1.0 SOCKET HEAD CAP SCREW (5mm HEX) USE FOR GROUND LUG ATTACHMENT

NO PAINT (MASK) SEE NOTE 3

.13 [3.2 mm]

4.75 [120.7 mm]

1.19 [30.2 mm]

3.31 [84.1 mm]

5.50 [139.7 mm]

NOTES:

- ANY CHANGES IN DESIGN, COMPOSITION, OR PROCESSING FROM APPROVED PRODUCTION SAMPLE PARTS REQUIRE COMPANY ENGINEERING APPROVAL PRIOR TO CHANGE IMPLEMENTATION.
- PAINT SPECIFICATION: SHERWIN WILLIAMS POLANE T F63TXA1415 - 4386 WITH EXTERIOR CATALYST V66V26 6:1
- PAINT MASKING AREAS:  
NO PAINT ON CONNECTOR THREADED PORTIONS NOR ON CONNECTOR INSIDES.  
NO PAINT ON HOUSING FACE FOR GROUND LUG SURFACE

3.98 [101 mm]

2.50 [63.5 mm]

.83 [15.9 mm]

1.28 [32.4 mm]

ASM DESCRIPTION	ASM PART NUMBER	DIFFERENCE
FSA S14WI AMPLFD W/ SRG SPPRSSN W/ DC BIAS SEL W/ ANTENNA MNTR	FSA-ABQ-AAS-AGZ	
FSA S14WI PASSIVE W/ SRG SPPRSSN W/ DC BIAS SEL W/ ANTENNA MNTR	FSA-AAQ-AAS-AGZ	

**RoHS**

ALL MATERIALS AND FINISHES SHALL COMPLY WITH EUROPEAN UNION RESTRICTION OF HAZARDOUS SUBSTANCES. (RoHS)

DRAWN JWK	DATE 27 JUNE 2006
CHECKED PWC	
APPROVED	

THE INFORMATION CONTAINED IN THIS DESIGN SET IS THE SOLE PROPERTY OF GPS SOURCE. USE OF THIS DESIGN IS RESERVED EXCLUSIVELY FOR SAID COMPANY. REPRODUCTION OR DISTRIBUTION OF ANY PORTION OF THIS DESIGN IS FORBIDDEN WITHOUT THE EXPRESS WRITTEN CONSENT OF GPS SOURCE.

TITLE FSA S14WI	DWG FILE NAME 031-FSA-AAQ-AAS-AGZ	REV 002
SCALE 1/2	GPS SOURCE PART NUMBER SEE TABLE	SHEET 1 OF 1