



SITEHAWK™ ANALYZER

SK-4500

OPERATION MANUAL

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INSTRUCTION BOOK PART NUMBER 920-SK-4500 REV. G

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Safety Precautions

The following are general safety precautions that are not necessarily related to any specific part or procedure, and do not necessarily appear elsewhere in this publication. These precautions must be thoroughly understood and apply to all phases of operation and maintenance.

WARNING

Keep Away From Live Circuits

Operating Personnel must at all times observe general safety precautions. Do not replace components or make adjustments to the inside of the test equipment with the high voltage supply turned on. To avoid casualties, always remove power.

WARNING

Shock Hazard

Do not attempt to remove the RF transmission line while RF power is present.

WARNING

Do Not Service Or Adjust Alone

Under no circumstances should any person reach into an enclosure for the purpose of service or adjustment of equipment except in the presence of someone who is capable of rendering aid.

WARNING

Safety Earth Ground

An uninterruptible earth safety ground must be supplied from the main power source to test instruments. Grounding one conductor of a two conductor power cable is not sufficient protection. Serious injury or death can occur if this grounding is not properly supplied.

WARNING

Resuscitation

Personnel working with or near high voltages should be familiar with modern methods of resuscitation.

WARNING

Remove Power

Observe general safety precautions. Do not open the instrument with the power on.

Safety Symbols

WARNING

Warning notes call attention to a procedure, which if not correctly performed, could result in personal injury.

CAUTION

Caution notes call attention to a procedure, which if not correctly performed, could result in damage to the instrument.

Note: *Calls attention to supplemental information.*

Caution Statements

The following equipment cautions appear in the text and are repeated here for emphasis.

CAUTION

Do not connect the unit to a PC USB port.
File transfer must be done using a USB Drive.

See Page 39, 45, and 58.

CAUTION

Only use the supplied AC adapter to charge the unit.
The unit cannot be charged through a USB port (i.e. from a laptop).
Charging from a power source other than the supplied charger may damage the battery.

See pages 6 and 52.

CAUTION

Do not touch the center pin of the Antenna Test Port with bare hands, water, or emery cloth. Otherwise, damage may occur to the connectors surface.

See page 52.

Safety Statements

USAGE

ANY USE OF THIS INSTRUMENT IN A MANNER NOT SPECIFIED BY THE MANUFACTURER MAY IMPAIR THE INSTRUMENT'S SAFETY PROTECTION.

USO

EL USO DE ESTE INSTRUMENTO DE MANERA NO ESPECIFICADA POR EL FABRICANTE, PUEDE ANULAR LA PROTECCIÓN DE SEGURIDAD DEL INSTRUMENTO.

BENUTZUNG

WIRD DAS GERÄT AUF ANDERE WEISE VERWENDET ALS VOM HERSTELLER BESCHRIEBEN, KANN DIE GERÄTESICHERHEIT BEEINTRÄCHTIGT WERDEN.

UTILISATION

TOUTE UTILISATION DE CET INSTRUMENT QUI N'EST PAS EXPLICITEMENT PRÉVUE PAR LE FABRICANT PEUT ENDOMMAGER LE DISPOSITIF DE PROTECTION DE L'INSTRUMENT.

IMPIEGO

QUALORA QUESTO STRUMENTO VENISSE UTILIZZATO IN MODO DIVERSO DA COME SPECIFICATO DAL PRODUTTORE LA PROZIONE DI SICUREZZA POTREBBE VENIRNE COMPROMESSA.

SERVICE

SERVICING INSTRUCTIONS ARE FOR USE BY SERVICE - TRAINED PERSONNEL ONLY. TO AVOID DANGEROUS ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING UNLESS QUALIFIED TO DO SO.

SERVICIO

LAS INSTRUCCIONES DE SERVICIO SON PARA USO EXCLUSIVO DEL PERSONAL DE SERVICIO CAPACITADO. PARA EVITAR EL PELIGRO DE DESCARGAS ELÉCTRICAS, NO REALICE NINGÚN SERVICIO A MENOS QUE ESTÉ CAPACITADO PARA HACERLO.

WARTUNG

ANWEISUNGEN FÜR DIE WARTUNG DES GERÄTES GELTEN NUR FÜR GESCHULTES FACHPERSONAL.

ZUR VERMEIDUNG GEFÄHRLICHE, ELEKTRISCHE SCHOCKS, SIND WARTUNGSARBEITEN AUSSCHLIEßLICH VON QUALIFIZIERTEM SERVICEPERSONAL DURCHZUFÜHREN.

ENTRETIEN

L'EMPLOI DES INSTRUCTIONS D'ENTRETIEN DOIT ÊTRE RÉSERVÉ AU PERSONNEL FORMÉ AUX OPÉRATIONS D'ENTRETIEN. POUR PRÉVENIR UN CHOC ÉLECTRIQUE DANGEREUX, NE PAS EFFECTUER D'ENTRETIEN SI L'ON N'A PAS ÉTÉ QUALIFIÉ POUR CE FAIRE.

ASSISTENZA TECNICA

LE ISTRUZIONI RELATIVE ALL'ASSISTENZA SONO PREVISTE ESCLUSIVAMENTE PER IL PERSONALE OPPORTUNAMENTE ADDESTRATO. PER EVITARE PERICOLOSE SCOSSE ELETTRICHE NON EFFETTUARE ALCUNA RIPARAZIONE A MENO CHE QUALIFICATI A FARLA.

UNITS ARE EQUIPPED WITH RECHARGEABLE BATTERIES.

THESE ARE TO BE REPLACED BY AUTHORIZED SERVICE PERSONNEL ONLY!!!

LAS UNIDADES VIENEN EQUIPADAS CON BATERIAS RECARGABLES.

¡¡¡Y SOLAMENTE EL PERSONAL DE SERVICIO AUTORIZADO PUEDE REEMPLAZARLAS!!!

GERÄTE SIND MIT WIEDER AUFLADBAREN BATTERIEN BESTÜCKT.

BATTERIEN SIND NUR VON QUALIFIZIERTEM SERICE PERSONAL AUSZUWECHSELN!!!

CES DISPOSITIFS SONT ÉQUIPÉS DE BATTERIES RECHARGEABLES.

SEUL LE PERSONNEL D'ENTRETIEN AUTORISÉ EST HABILITÉ À LES REMPLACER!

LE UNITÀ SONO DOTATE DI BATTERIE RICARICABILI,

CHE DEVONO DA COME SPECIFICATO DAL PRODUTTORE LA PROTEZIONE DI SICUREZZA POTREBBE VENIRNE COMPROMESSA.

About This Manual

This manual covers the operating and maintenance instructions for the following models:

SK-4500-TC

Changes to this Manual

We have made every effort to ensure this manual is accurate. If you discover any errors, or if you have suggestions for improving this manual, please send your comments to our Solon, Ohio factory. This manual may be periodically updated. When inquiring about updates to this manual refer to the part number and revision on the title page.

Literature Contents

Introduction — Describes the features of the Bird SiteHawk™, lists equipment supplied and optional equipment, provides power-up instructions and measurement settings.

Measure Match Mode — Lists the steps to make match measurements, as well as providing instructions for all functions available in Measure Match mode.

Distance-to-Fault Measurements — The DTF measurement shows the location of any problems in the antenna system. This is shown in either feet or meters from the cable end connected to the SiteHawk.

Utilities — Describes built-in instrument utility features and how to use them.

Maintenance — Lists routine maintenance tasks as well as troubleshooting for common problems. Specifications and parts information are also included.

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The SiteHawk Analyzer is a multifunction test instrument for use in installation and maintenance of wireless systems.

The SK-4500 has a frequency range of 1 MHz to 4.5 GHz. See [“SiteHawk Analyzer Specifications” on page 3](#) for additional data on each SiteHawk Model.

Antenna systems are tested by using a SiteHawk Analyzer to measure match conditions. Data points measured across a user-specified frequency band or distance range are graphed on a 1920 x 1080 pixel touch screen display area.

Power Meter Application

SiteHawk Analyzers include the Bird RF Meter Application. The Bird RF Meter is an Android application designed to work with a wide variety of Bird Power Sensors. To measure transmitter power, connect an external power sensor to the SiteHawk. Power measurements verify and monitor the condition of a transmitter system. For additional information and a list of compatible power sensors, view the Bird RF Meter Help system.

Items Supplied

Description	Part Number
Hard Carrying Case	7002A218-2
Soft Carrying Case	7002A219-1
USB Adapter	SK-CONN-OTG-2
AC Adapter (12 VDC)	SK05T - 1200300Z
Touch Pen (stylus)	SK-TP-112
USB Drive	5A2745-1
Instruction Manual	920-SK-4500
RF Cable, 1 meter	SK-TC-MNFN-1M
Calibration Combination (Cal Combo), DC - 6 GHz	SK-CAL-MN-C6
Li-ion Battery (7.4 V, 6800 mAh)	SK-BTY-7468

Optional Accessories

Description	Part Number
N-type, Male to 7/16 DIN, Female adapter	PA-MNFE

SiteHawk Analyzer Specifications

Frequency Range	1 MHz to 4.5 GHz
Frequency Accuracy	±2.5 ppm
Frequency Resolution Setting	1 kHz
Output Power	-10 dBm
Reflected Amplitude Accuracy	
-10 dB to 0 dB	±0.6 dB
-20 dB to -10 dB	±0.8 dB
-35 dB to -20 dB	±3.0 dB
Trace Noise Amplitude (IFBW 1kHz)	0.02 dB rms
Single Point Measure Time	1.0 ms
Data Points	51 to 3201
Measure Bandwidth	100 Hz to 30 kHz
Temperature Stability	0.01 dB/°F 0.02 dB/°C
Return Loss Measurement Range	0 dB to -60 dB
Resolution	0.01 dB
VSWR Measurement Range	1.0 to 65.0
Resolution	0.01
Cable Loss Measurement Range	0 dB to 30 dB
Resolution	0.01 dB
DTF Range	0 to 5000 ft. 0 to 1500 m.
Test Port Connector	N-type, Female
Impedance	50 ohms
Connector	USB-C, USB 3.0
Dimensions (L x W x H)	7.7 x 3.6 x 2.4 in. 195 x 90 x 60 mm
Weight	1.98 lbs. 0.9 kg
Maximum Input Power	+22 dBm
Maximum Input Voltage	50 V
Operating Temperature	14° to 131° F -10° to +55° C
Storage Temperature	-40° to 176° F -40° to +80° C
Battery Charging Temperature	32° to 95° F 0 to +35° C
Altitude	Up to 15000 ft. Up to 4600 m
Humidity	95±5° max (non-condensing)

Pressure	84 to 106.7 kPa
Warm-Up Time	15 minutes
Power Measurement	Yes, with RF Meter App
Compatible Devices	4043, 5012D, 5014, 5015, 5015-EF, 5016D, 5017D, 5018D, 5019D, 7020, 7022, 7023
Storage Capacity	16 GB
Immunity to Interfering Signals	+13 dBm
CE	CE compliant. EMC, Safety, and RoHS
Battery	10 hours continuous use 7.4 V, 6800 mAh
Battery Charge Time Power Off: Power On:	5 Hrs for full charge 8 Hrs for full charge
Languages	English, Chinese, Spanish

Calibration Combo Specifications

Frequency	DC - 6 GHz
Resistance	50 Ohm
Average Power	≤ 1 W
Connectors	
Load Return Loss VSWR	≤ -35 dB ≤ 1.032
Open Phase Deviation	≤ ± 0.6°
Short Phase Deviation	≤ ± 0.6°
Operating Temperature	49° to 95° F 15° to 35° C
Storage Temperature	-40° to 167° F -40° to 75° C

RF Cable (1 Meter) Specifications

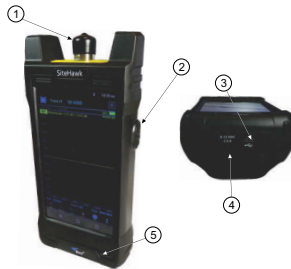
Frequency	DC - 6 GHz
Resistance	50 Ohm
VSWR	1.15 max

Measurement Capability

- Fast measurement speed
- Seven user-selectable trace capture options: 51, 101, 201, 401, 801, 1601, or 3201 data points per sweep
- Adjustable pass/fail limit with visual indicator
- 16 GB of internal flash memory for storing thousands of traces and setups
- X and Y scales and units are user adjustable
- Six markers, direct or difference measurement
- Measure relative to limit line or recalled trace
- Measurement hold to temporarily store a trace
- Frequency Start/Stop or Center/Span frequencies
- Return Loss [dB], Cable Loss [dB], SWR [ratio], DTF SWR [ratio] or DTF Return Loss [dB]

Connectors and Ports

Figure 1 SK-4500 Connectors and Ports



1	Antenna Test Port	Female N connector for connecting to the antenna. Use a phase-stable cable for best results.
2	Power Button	Used to power on and off the SiteHawk
3	USB-C 3.0 Type	USB device port for connection to a USB Drive or Bird Power Sensor.
4	Charger Input	Input connector for charging the SK-4500 using the supplied charger.
5	Charge Indicator	Indicator is red when charging, green when fully charged

Power

The SiteHawk Analyzer has an internal, rechargeable, lithium-ion battery pack.

CAUTION

Only use the supplied AC adapter to charge the unit.
The unit cannot be charged through the USB port (i.e. from a laptop).
Charging from a power source other than the supplied charger may damage the battery.

- The unit will operate for approximately 10 hours with a full charge.
- Recharging time, from a full discharge, is approximately 5 hours with unit powered off.

Note: *When the unit is received the battery may not be fully charged. An AC adapter should be used when operating the unit for the first time.*

Powering On

1. Press Power button for 5 seconds.

Note: *Unit will complete power-up in approximately 30 secs.*

Powering Off

1. Press Power button for three seconds.

Note: *A Device Options dialog will open.*

2. Select Power Off.

Note: *A Power Off dialog will open.*

3. Press Ok.

Sleep Mode

Press and release Power button.

Note: *The display screen will be shut down. The SiteHawk Analyzer will still be on.*

Measurement Port

CAUTION

Do not exceed +22 dBm (100 mW) RF Power input at the measurement port. Damage to the units RF module will result.

Note: Antenna systems can build up a static charge large enough to damage the SiteHawk, if discharged through the device. It is recommended a load or attenuator be used to bleed off any static charge prior to connecting the SiteHawk to the system.

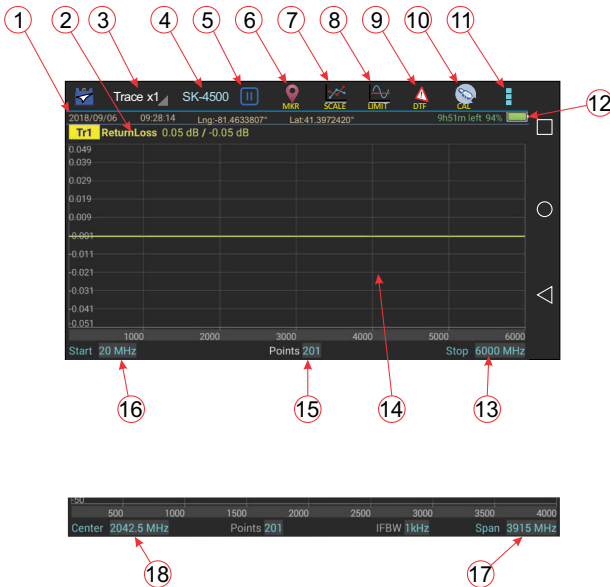
The measurement port is a 50 ohm N-type. This port is used to connect the device under test.

User Interface

The SiteHawk user interface consists of a touch screen interface. The user presses the screen to access menus, change settings, perform measurements and save results.

Note: The displays used in this manual are shown with the SiteHawk in the horizontal position, some menus may display differently if accessed with the unit in a vertical position. Display options can be controlled via the settings menu on the home screen.

Figure 2 User Interface Description (Match Measurement Mode)



Item	Description
1	Current Date, Time, latitude and longitude. Note: <i>Location services must be set to On for the SiteHawk to display latitude and longitude data. See "Accessing Communication Services" on page 51.</i>
2	Measurement Mode, press to display Measurement Mode menu.
3	Trace Selection, press to choose number of traces to display.
4	SiteHawk Model Number
5	Pause icon, when pressed pauses data acquisition. When data acquisition is paused a play icon is displayed.
6	MKR icon, press to display the Marker menu.
7	SCALE icon, press to display the scale menu.
8	LIMIT icon, press to display the limit menu.
9	DTF icon, press to display the Distance to Fault menu.
10	CAL icon, press to display the calibration menu.
11	Menu icon, press to display additional utility menus: MEM, FREQ, RESET, FILE, PNG, SYS.
12	Battery charge remaining in time, percentage, and visual indicator.
13	Stop Frequency, press the data field to change the value, or press the label to change to frequency Span (17).
14	Sweep display area.
15	Points, press the data field to choose the number of measurement points.
16	Start Frequency, press the data field to change the value, or press the label to change to Center Frequency (18).
17	Span displays the current frequency span. Press the data field to change the value, or press the label to change to Stop Frequency (13).
18	Center Frequency, press the data field to change the value, or press the label to change to Start Frequency (16).

Note: *When a fault Detection mode is selected, the Start distance, Stop distance, and DTFMax fields are also displayed below the sweep display area.*

Setting the Measurement Frequencies

Frequencies can be set manually. Frequency range should be greater than the normal range of the antenna.

Example - For a 450 MHz antenna, set the start frequency at 400 and the stop frequency at 500 MHz, for an 800 MHz antenna, set the start frequency at 700 and the stop frequency at 1,100 MHz.

Note: Changing the frequency settings will automatically turn calibration off. Always set the frequency before calibrating the unit.

Note: If a frequency that is outside of the range of the SiteHawk is entered, the SiteHawk will override the entry and set the minimum or maximum frequency of the model.

There are two methods available to change the start, stop, center frequencies and frequency span; display screen entry and FREQ menu entry.

Changing Measurement Frequency on the Display

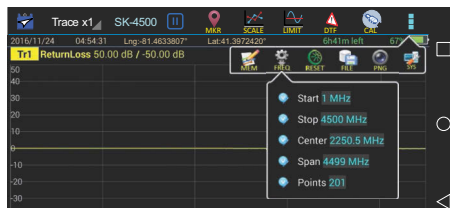
1. Press the data field of the frequency to change.
2. Type the new value using the number pad.
3. Press Enter.

Changing Measurement Frequency on the FREQ Menu

1. Press the Menu icon. See [Figure 3 on page 9](#).
2. Press FREQ on the menu.
3. Press the data field of the frequency to change.
4. Type the new value using the number pad.
5. Press Enter.
6. Tap outside of the menu to close.

Note: If Stop and Start frequencies are entered, the unit will automatically update the Center and Span frequency. If Center or Span is entered, the frequency setting will update automatically.

Figure 3 Changing Sweep Frequencies



Setting the Measurement Data Points

Select the number of data points to take during a measurement. There are seven data point options:

- 51 points
- 101 points
- 201 points
- 401 points
- 801 points
- 1601 points
- 3201 points

Increasing the number of data points increases the measurable distance in Distance-to-Fault measurements and increases the detail in Measure Match mode measurements. When saving a trace, the number of data points collected are saved.

A progress bar, just below the x-axis, will indicate the progress of the sweep.

When the number of measurement data points are changed, the current trace is erased and the Save softkey is disabled until the sweep finishes and the screen displays the first new trace.

Changing the Number of Measurement Data Points

1. Press the Points data field on status bar
2. Select desired data point option.

Figure 4 *Changing the Number of Measurement Data Points*



Setting the Distance Units and Cable Values (DTF Menu)

The trace can display the entire length (distance) of the cable system being measured or a smaller portion of the length for better detail.

If it is suspected that there might be a fault at a known distance along a cable, set the display to show only that area by using the start and stop distance. Think of this as zooming in on a section of the cable. Both the start distance (where to begin the trace display) and the stop distance (where to end the trace display) can be set.

Distance Unit

1. Select DTF.
2. Unit Select units settings.

Note: *The system default unit m, optional unit ft.*

Start Distance

1. Select the input box.
2. Set start distance.

Stop Distance

1. Select the input box.
2. Set stop distance.

Windowing

Windowing is an option on the SK-4500 that will digitally average the data on the displayed trace, in effect, making the trace appear smoother. In some situations, it will make individual problems easier to spot, but in others it may mask details that are needed. Experimentation is the key word.

1. Select the Window.
2. Select the corresponding window style.

Note:

- *Default is Normal*
- *Minimum - will show all the detail in the trace. In some situations it can be difficult to spot individual problems.*
- *Maximum - will add the most digital averaging of the display and can make some problems “disappear” or actually test as passing.*

Velocity

1. Select Velocity.
2. Set speed value.

Note: *Manually enter cable velocity value or select the cable type from the cable list.*

Cable Loss

1. Select CableLoss.
2. Set cable loss values.

Note:

- *Manually enter cable loss value or select the cable type from the cable list.*
- *If manually entering the CableLoss (or Attenuation value), it must be entered in dB/ft, or dB/meter. The manufacturer generally gives these values as dB/100ft or dB/100meters.*

Cable List

The Cable List contains known cable values for a variety of cable types. The Cable List may be edited to add or delete cables. See [“Edit Cable List” on page 54](#).

1. Select CableList.
2. Set cable type.
3. Select a certain cable type.

Note: *Each cable type in the cable list has the fixed values for cable velocity and cable loss. Selecting a cable from the cable list will automatically populate the cable velocity and cable loss data fields.*

Trace Settings

The number of traces displayed and the minimum and maximum grid scale values can be manually changed.

Note: SiteHawk is capable of displaying up to 4 traces.

1. Press the Trace name (e.g. Tr1) to select the active trace. See [Figure 5 on page 13](#).

Note: The Trace name will be highlighted to indicate the active Trace.

2. Trace Count Setting

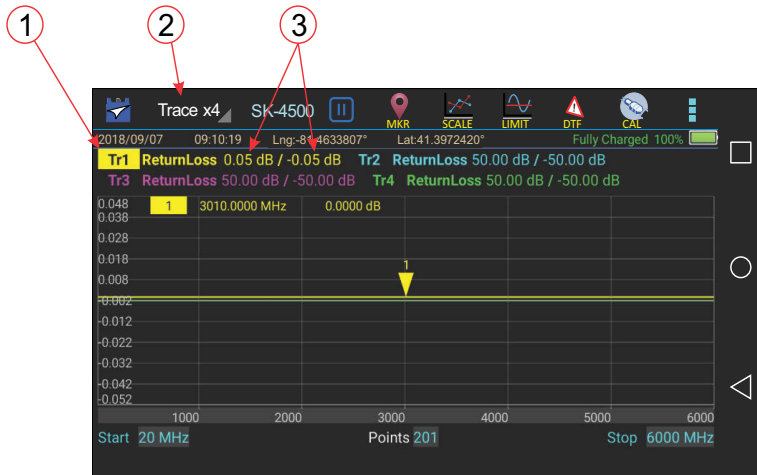
- a. Press the Trace icon on the menu bar.
- b. Choose the number of traces to display x1, x2, or x4.

Note: Every trace has a name: Tr1, Tr2, Tr3, or Tr4, the name cannot be changed.

3. Change one or both trace limits to change the grid scale for the trace:

- Set the maximum value
 - a. Press the maximum value to open the Top value dialog.
 - b. Enter a maximum value.
- Set the minimum value
 - a. Press the minimum value to open the Bottom value dialog.
 - b. Enter a minimum value.

Figure 5 Tracing Settings



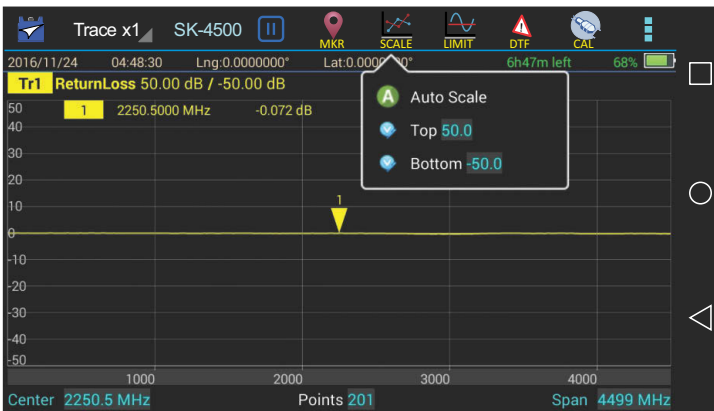
Adjusting the trace within the selected scale

Note: Scale settings only affect the active trace, if more than one trace is currently displayed, select the desired trace before changing scale.

1. Press SCALE icon. See [Figure 6 on page 14](#).
2. Select one of the following from the menu:
 - a. For Manual Operation:
 - Press Top to change upper limit of the display
 - Press Bottom to change the lower limit of the display
 - b. For Auto Scale:
 - Press Auto Scale for the system to choose the best fit for the active trace.

Note: The scale can also be dynamically changed by pressing and dragging the trace up or down in the display window.

Figure 6 Adjusting the Trace



Calibrating the SiteHawk Analyzer

For best results, set the frequency and calibrate the Bird Site Analyzer immediately before taking measurements.

Note: Use a precision open, short, load (OSL) calibration standard or “Calibration Combo” for accurate measurement results.

Note: When using an extension cable, a phase stable cable is needed to ensure performance and accuracy.

Note: Changing frequency settings will automatically turn calibration off. Always set the frequency before calibrating the unit.

1. Press the Calibrate icon.
2. Connect the Cal Combo “Open” connector to the unit antenna port.
3. Press the Open softkey.
4. Wait for the unit to sweep and a Green Check to display.
5. Connect the Cal Combo “Short” connector to the unit antenna port.
6. Press the Short softkey
7. Wait for the unit to sweep and a Green Check to display.
8. Connect the Cal Combo “Load” connector to the unit antenna port.
9. Press the Load softkey
10. Wait for the unit to sweep and a Green Check to display.

Note: During calibration, the color of the icon display is yellow.

Note: After calibration, the display will resemble [Figure 7 on page 15](#) and Correction will be set to On.

Figure 7 Calibration Display Screen



Match measurement verifies and monitors the match conditions in the antenna system at various frequencies. The results are shown on an x-y graph. Frequency is shown on the x-axis and Return Loss or SWR is shown on the y-axis.

Before making a Match Measurement, be sure to have a Calibration Combination (Cal Combo), all necessary cables with adapters of the correct size and connector type.

Selecting Measure Match Modes and Measurement Units

1. Press trace measurement field to display menu.
2. Select one of the following from the Measurement Mode menu:
 - ReturnLoss
 - SWR

Note: When making a match measurement, select units for the Y (vertical) scale: SWR for standing wave ratio or Return Loss for dB.

Figure 8 Selecting the Measure Match Mode



3. Select the number of Data Measurement points.
4. Set the Frequency range.

Note: Frequency range should be greater than the normal range of the antenna.

Example - For a 450 MHz antenna, set the start frequency at 400 and the stop frequency at 500 MHz, for an 800 MHz antenna, set the start frequency at 700 and the stop frequency at 1,100 MHz.

5. Calibrate the SiteHawk. See [“Calibration” on page 15](#).

CAUTION

Do not exceed +22 dBm (100 mW) RF Power input at the measurement port. Damage to the units RF module will result.

Note: Antenna systems can build up a static charge large enough to damage the SiteHawk, if discharged through the device. It is recommended a load or attenuator be used to bleed off any static charge prior to connecting the SiteHawk to the system.

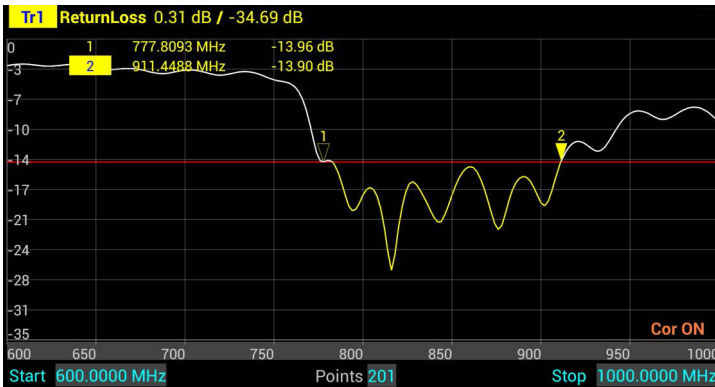
Note: Changing frequency settings will automatically turn calibration off. Always set the frequency before calibrating the unit.

6. Connect the SiteHawk to the device under test.
7. Wait 10 Seconds for the sweep to update.

Interpreting the Measurement

The graph below shows a typical Match Measurement of an antenna.

Figure 9 Interpreting Match Measurement



The graph contains the following elements:

- Vertical grid scale (y axis) displays dB and ratio data values.
- Horizontal grid scale (x axis) displays frequency, time or distance data values.
- The measured value of the Markers (1 and 2 in this example).
- Trace number (Tr1) and color is used identify the trace.
- When scanning duration is more than 1 second, a current position indicator will appear.

Cable Loss Measurement

Ensure that the cable being tested is unterminated (not connected to anything at the far end).

Note: Ensure the cable is disconnected from any RF power source.

Note: Ensure the frequency band of the system is known.

Performing a Cable Loss Measurement

1. Press trace measurement field to display Measurement Mode menu.
2. Press CableLoss in the Measurement Mode menu.

Figure 10 Selecting Cable Loss Measurement



3. Set the frequency start and stop to a range that is greater than the normal range of the antenna.

Example - For a 450 MHz antenna, set the start frequency at 400 and the stop frequency at 500 MHz. For an 800 MHz antenna, set the start frequency at 700 and the stop frequency at 1,100 MHz.

4. Connect a phase stable cable to the SiteHawk Analyzer antenna test port.
5. Calibrate the SiteHawk Analyzer. See [“Calibration” on page 15](#).

Note: After Calibration, with the load still connected, the Output must be below -25 dB. If not, there may be an issue.

6. Remove the Cal Combo unit from the cable.
7. Connect the phase stable cable to one end of the cable under test.
8. Connect the Short connection on the Cal Combo unit to the other end of the cable under test.
9. Wait at least 10 seconds to allow the trace to update.
10. Place a marker (mark 1) at the minimum loss point within the frequency band on the trace. See [“Markers” on page 27](#).

11. Place a marker (mark 2) at the maximum loss point within the frequency band on the trace.
12. Save and label the trace, if appropriate. See [“Recall Trace Data” on page 42.](#)

Interpreting a Cable Loss Measurement

The graph below shows a typical cable loss measurement. Note that the scale is greatly reduced to show the cable’s variation across frequency.

Figure 11 Interpreting Cable Loss Measurement



1. Marker 1 and Marker 2 indicate the minimum and maximum loss for the cable under test.
2. Take the average of M1 and M2.

Note: This is the average cable loss across the frequency band.

3. Compare the loss with the manufacturer’s specified loss for a cable of this length.

Note: If they do not correspond, measure the cable loss again, then check the cable for problems.

Fault location identifies the position of impedance discontinuities (reflections) within the antenna system. The measurement results are displayed on an x-y graph. Distance from the SiteHawk Analyzer is shown on the x-axis, while relative magnitude of the discontinuity is shown on the y-axis.

Before making a fault location measurement, ensure that the following items and information are present:

- Calibration Combination (Cal Combo) calibration unit
- All necessary cables and adapters of the correct size and connector type
- The velocity of propagation for the cable type being measured (obtain from the cable manufacturer)
- Number of data points to use in making the distance to fault measurement (user choice)

Frequency Span and Max Distance

Frequency span, the velocity of propagation of the cable (V_p) and the number of measured data points determine the maximum distance tested during fault location test.

Max Distance

The maximum measurable distance can be calculated by SiteHawk based on the specified frequency span, or the maximum distance can be entered manually instead of entering the frequency span. If the maximum distance being measured is entered instead of the frequency span; the SiteHawk calculates the frequency span.

If a maximum distance is manually entered, select the data points before entering the max distance.

Note: *Changing the frequency span or the max distance will automatically turn calibration off. Always set the frequency span or max distance before calibrating the unit.*

Note: *If a maximum distance less than the total length of the cable system is selected, the trace will not show the end of the cable system (antenna). To display the full cable system always set the maximum distance to a value that is a few feet or meters greater than the entire length of the cable system.*

Data Points

Increasing the number of data points increases the measurable distance (401 points results in twice the distance of 201 points, and 801 points results in four times the distance of 201 points). When changing the number of data points measured, the software automatically recomputes the new maximum measurable distance. If a maximum distance is entered manually, be sure to select the data points before entering the max distance. Changing data points does not turn calibration off.

Note: *Changing data points does not turn calibration off.*

Frequency Span

The larger the frequency span, the shorter the measurable distance. Narrowing the frequency span increases the measurable distance.

Velocity of Propagation

The velocity of propagation (Vp) is a characteristic of the cable and is expressed as a percentage. Consult the cable manufacturer's specifications to get the velocity of propagation value for the cable being used.

Calculating the Frequency Span

$$\Delta T = \frac{1}{\Delta F} = \frac{N-1}{F_{max} - F_{min}}$$

Note: *N = Test points*

F_{min} = Start frequency

F_{max} = End frequency

This max distance value can be recalculated as the max distance for the DTF test.

$$DTF_{max} = \frac{C \cdot V_p \cdot \Delta T}{2} = \frac{C \cdot V_p \cdot (N-1)}{2 \cdot (F_{max} - F_{min})}$$

Note: *C = Speed of light*

Vp = Velocity of Propagation (cable)

Example - *For a cable with a dielectric constant of 1, the velocity percentage is 100% and 201 data points are chosen, then the SiteHawk Analyzer should be set to a frequency span of 0.1 MHz (85MHz to 85.1MHz). The maximum distance of fault will be 299,792.458 meters.*

Selecting Fault Location Mode

1. Press trace measurement field to display Measurement Mode menu.
2. Press to select one of the following from the Measurement Mode drop down menu:
 - DTF_SWR
 - DTF_RL

Note: When making Distance to Fault measurement, select units for the Y (vertical) scale: DTF_SWR for standing wave ratio or DTF_RL for return loss in dB.

Figure 12 DTF Mode Select



3. Press the Points data field and enter the number of Data Points.
4. Enter start and Stop frequencies.
5. Press Start distance field and enter the start value.
6. Press the Stop distance field and enter the stop value.
7. Press DTF Menu.
8. Press Window selection to change the display to the desired value.
9. Enter Cable data using one of the following methods
 - a. Press velocity and enter the cable velocity. Press cable loss and enter the cable loss value.
 - b. Press cable list, select the cable type from the list, cable values will be automatically entered for testing.
10. Press the Menu icon, then Press MEM menu icon. Verify Trigger is set to CONTINUE, Press HOLD to toggle to CONTINUE if required.
11. Calibrate the SiteHawk. See [“Calibration” on page 15.](#)

CAUTION

Do not exceed +22 dBm (100 mW) RF Power input at the measurement port. Damage to the units RF module will result.

Note: *Antenna systems can build up a static charge large enough to damage the SiteHawk, if discharged through the device. It is recommended a load or attenuator be used to bleed off any static charge prior to connecting the SiteHawk to the system.*

12. Connect the SiteHawk Analyzer to the cable being tested.

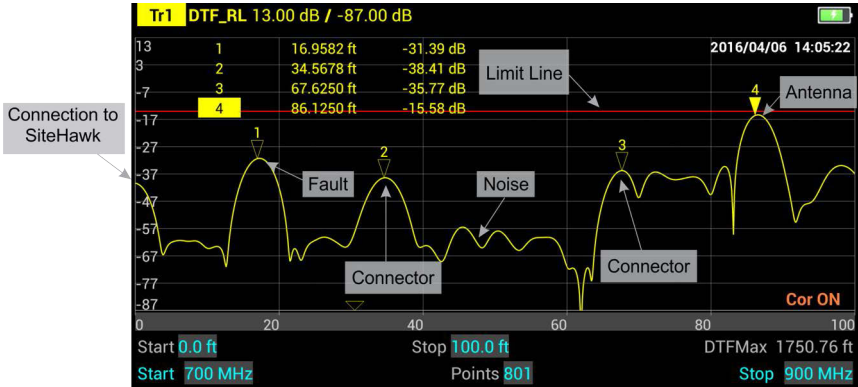
Note: *If the SiteHawk Analyzer is calibrated with a phase stable cable connected to its antenna port, do not remove the cable. Connect it to the cable to be tested.*

13. Wait at least 10 seconds for the sweep to update.
14. Press the Menu icon, then Press MEM menu icon. Press CONTINUE and verify Trigger toggles to HOLD.

Interpreting the Fault Location Measurement

The graph below shows a typical Fault Location measurement for an antenna system. The table lists typical component return losses.

Figure 13 Interpreting Fault Location Measurement



Typical Component Return Loss	
Antenna at Resonance	-14 dB
Connector	-25 dB
Jumper	-35 dB
Lightning Protector	-25 dB
Transmission Line	-30 dB

Each connector or jumper will show as a spike. If it is larger than the typical value, check the connector for damage.

Spikes where there are no components represent faults. Note the distance and check the line at that point for damage.

The largest spike is usually due to the antenna. Typically the trace after the antenna can be ignored.

Note: *If a maximum distance less than the total length of the cable system is selected, the trace will not show the end of the cable system (antenna). To display the full cable system always set the maximum distance to a value that is a few feet or meters greater than the entire length of the cable system.*

A large spike (fault) near the SiteHawk Analyzer will mask other faults farther away. When a large spike near the Site Analyzer is found, fix it and then repeat the Fault Location measurement.

Limit Line

The limit line helps to set off those parts of a trace that are outside of the acceptance (limit) values. It appears as a red horizontal line at the limit line value. The part of the trace that is not acceptable will display in white. Additionally, identification of signals falling outside acceptable limits can be visually and audibly enhanced using a failure flag and alarm.

Note: *Limit lines are available in any measurement mode.*

Setting Limit Lines

1. Press LIMIT icon.

Figure 14 *Limit Menu*



2. Select from the following limit options.

Limit (On/Off)

Press to toggle limit line on and off.

Style (Max/Min)

Press to toggle maximum or minimum limit line.

Note: *When the Style is set to Max, anything above the Limit Line will be flagged as Fail. When the Style is set to Min, anything below the limit line will be flagged as Fail.*

Value

Sets the position of the limit line on the vertical scale (Y axis). Press the field to enter a value.

Step

Sets the numerical value the limit line will move when the Move UP or Move Down button are pressed. Press the field to enter a value.

Move Up

Press to move limit line up the vertical scale. Each press will move the limit line the value in the Step field.

Move Down

Press to move limit line down the vertical scale. Each press will move the limit line the value in the Step field.

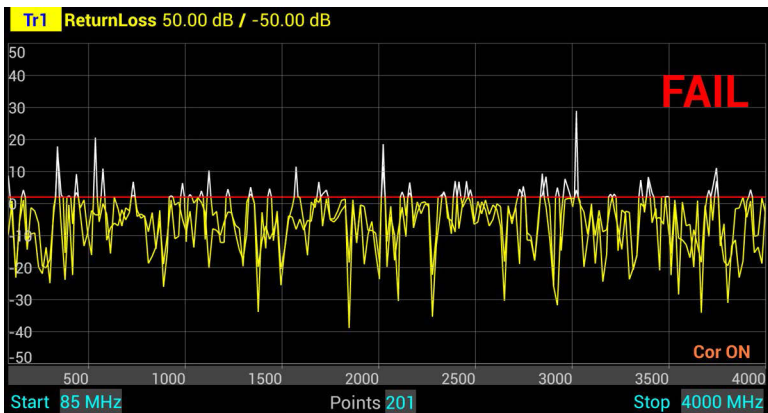
FailFlag (On/Off)

Press to toggle fail flag on and off. The words **PASS** or **FAIL** will be displayed in the sweep display area to indicate if the active signal is within or outside the limits set by the limit line.

FailAlarm (On/Off)

Press to toggle fail alarm on and off. An audible alarm will sound if the active signal is outside the limits set by the limit line.

Figure 15 Example Limit Line



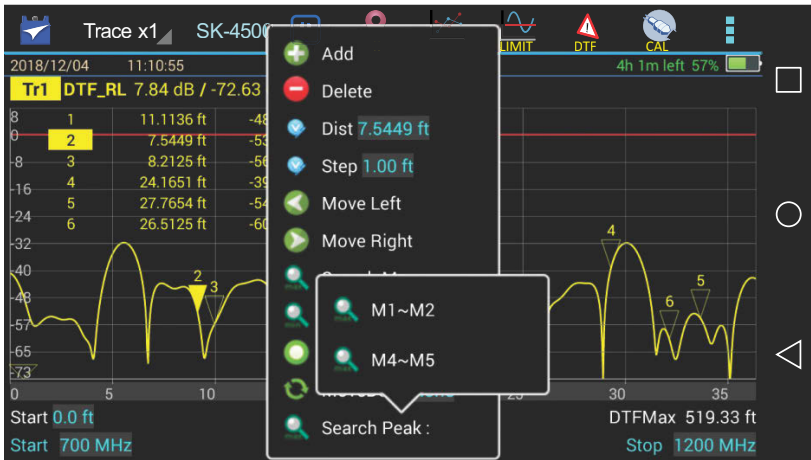
Markers

Each marker is displayed as a triangle pointer. Up to six markers can be used with each trace to visually indicate the trace value at specific frequency points. Only markers for the active trace are displayed. The SiteHawk analyzer displays the frequency and signal value for each marker at the top of the screen. The difference (delta) in frequency between two markers can also be displayed. Markers indicate SWR to 0.01, and Return Loss or Cable Loss to 0.1 dB.

Setting Markers

1. Press the MKR icon.

Figure 16 Marker Menu



2. Select from the following marker options:

Add

Press Add to add a marker.

Delete

Pressing Delete will delete the active marker. If deleting a marker, select the marker before opening the marker menu.

Freq

Indicates the current frequency position of the active marker. Press the Freq field to enter a new position/frequency for the marker.

Note: Any marker position can be dynamically changed by pressing and dragging the marker left or right on the display screen.

Step

Sets the frequency value the active marker will move when the Move Left or Move Right buttons are pressed. Press the Step field to enter a value.

Moves the position of the marker left or right by the step entered.

Move Left

Press to move the active marker to the left. Each press will move the active marker the value in the Step field.

Move Right

Press to move the active marker to the right. Each press will move the active marker the value in the Step field.

Search Max

Press to move the active marker to the maximum value position on the trace.

Search Min

Press to move the active marker to the minimum value position on the trace.

DeltaMarker

Press to toggle delta marker function on and off.

MoveDelta

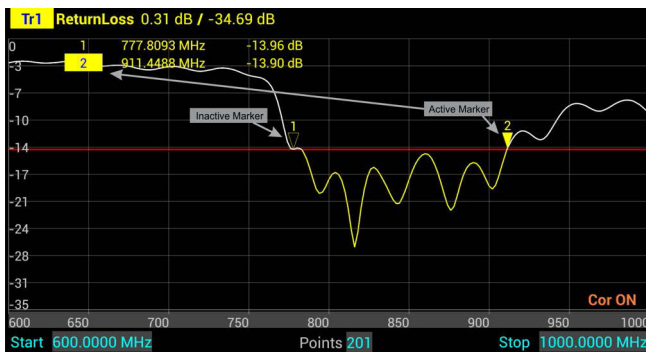
Press to move the delta marker indicator to highlight a specific delta marker.

Search Peak: M1~M2, M4~M5

Press **M1~M2** to move marker 3 to the peak signal between marker 1 and marker 2.

Press **M4~M5** to move marker 6 to the peak signal between marker 4 and marker 5.

Figure 17 Marker Examples



Using Delta Markers

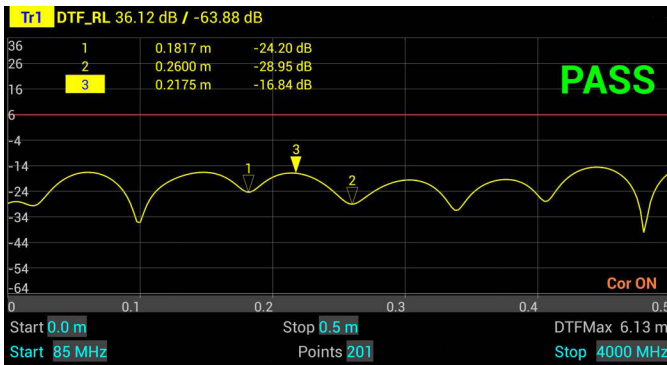
The delta marker feature displays the difference (delta) in both frequency (or distance) and value between the active marker and all other markers. All markers follow the current trace only.

Note: The Delta marker compares points on one trace and at least two markers must be displayed for the Delta Option to work.

1. Select the marker on the screen to be the active marker.

Note: In [Figure 18](#), marker 3 is the active marker, marker 1 and 2 are turned on.

Figure 18 Active Marker



2. Press MKR icon, and select DeltaMarker.

Note: In [Figure 19](#), marker 3 is highlighted, markers 1 and 2 are now delta markers 1-3 and 2-3. Delta markers 1-3 and 2-3 display values that are the difference between their positions and the position of marker 3.

Figure 19 Highlighted Markers



- Press MKR icon, and select MoveDelta.

Note: [Figure 20](#) shows Marker 1-3 is now highlighted.

Figure 20 Highlighted Delta Marker



Peak Search Between Markers

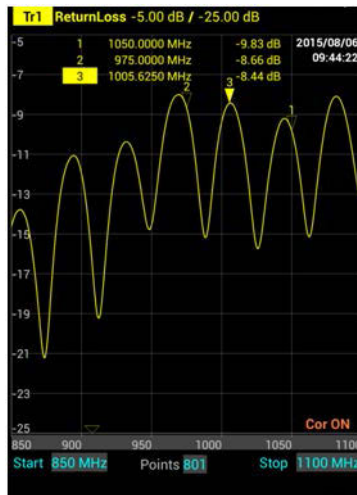
The peak search between markers feature causes a marker to find the peak between two other markers. M1 ~ M2 selection causes marker 3 to move to the peak signal between marker 1 and marker 2 positions. M4 ~ M5 selection causes marker 6 to move to the peak signal between marker 4 and marker 5 positions. All markers follow the current trace only.

Note: A minimum of three markers must be displayed for the peak search between markers to work. Marker 3 will always find the peak between marker 1 and 2, regardless of how many other markers are displayed, and marker 6 will always find the peak between marker 4 and 5.

1. Press MKR icon, and Add markers 1, 2, and 3. If desired add markers 4, 5, and 6 also.
2. Move marker 1 and 2 to the upper and lower limit for the peak search. If desired, move markers 4 and 5 to a second area of interest.
3. Press MKR icon, and select Search Peak:
4. Select either **M1 ~ M2** or **M4 ~ M5**

Note: [Figure 21](#) shows marker 3 at the peak signal position between marker 1 and marker 2.

Figure 21 Marker 3 Peak Search: M1~M2

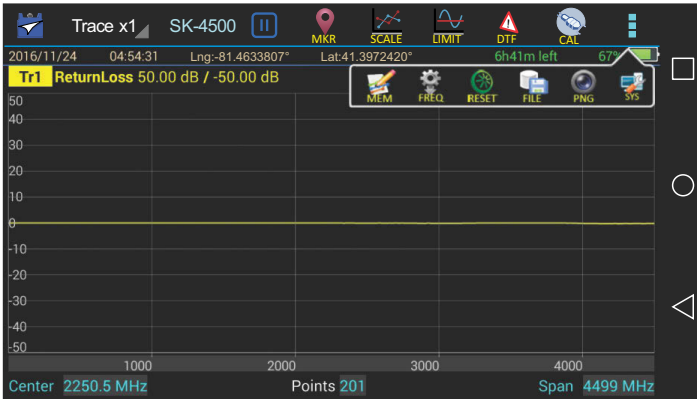


Utility Menus

Pressing the Menu icon will display the utility menus: MEM, FREQ, RESET, FILE, PNG, SYS. See [Figure 22](#).

These menus are described in this section with the exception of the FREQ menu, the FREQ menu is described in "[Setting the Measurement Frequencies](#)" on [page 9](#).

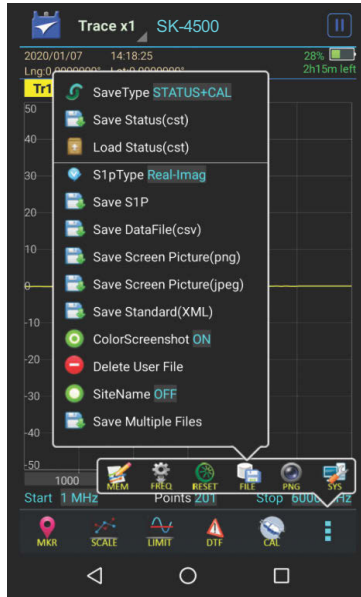
Figure 22 Utility Menus



FILE Menu

Pressing the FILE icon will display the file menu. See [Figure 23](#).

Figure 23 File Menu



Saving and Recalling Traces

Traces and measurement data can be saved and recalled from either the unit's internal memory or an external USB thumb drive. See [“Data Save and Export” on page 39](#).

Screenshots

Screenshots can be saved by using the Save Screen Picture options on the File menu, or by pressing the PNG Icon. The current time is added to all screen shots. The site name may be added as an option.

Save Screen Picture (png)

Saves a PNG file of the current Sweep Display Area, press the menu option and a save dialog is displayed allowing the user to enter a file name or use the default file name.

Note: *If the Site Name option is set to ON an Edit SiteName dialog box will be displayed each time screen shot is taken.*

Save Screen Picture (jpeg)

Saves a JPEG file of the current Sweep Display Area, press the menu option and a save dialog is displayed allowing the user to enter a file name or use the default file name.

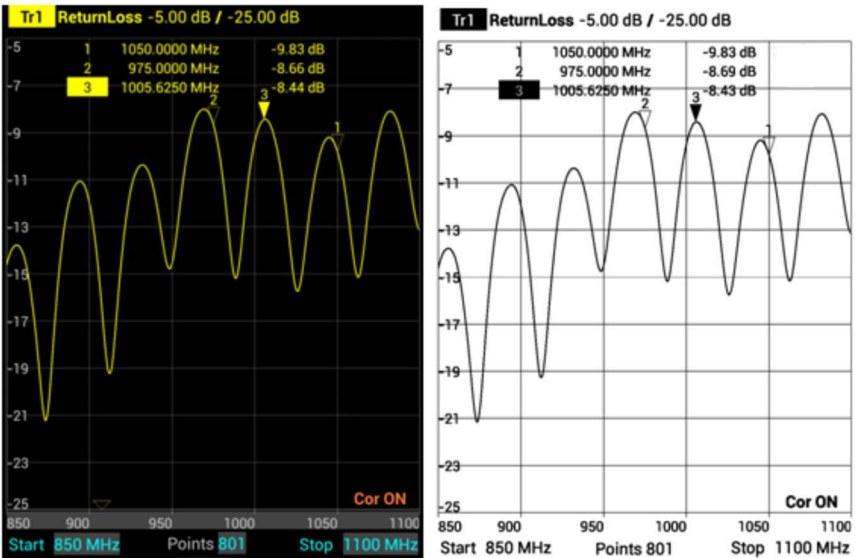
Note: If the Site Name option is set to ON an Edit SiteName dialog box will be displayed each time screen shot is taken.

Color Screen Shot

Press to toggle screen shots in color or black and white. When set to OFF screen shots will be black and white, when set to ON screen shots will be in color. See [Figure 24](#)

Note: The default setting for Color Screen Shot option is ON. If the reset function is executed on the SK-4500, the Color Screen Shot option is reset to ON.

Figure 24 Screen Shots in Color or Black and White

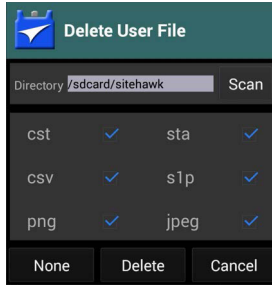


Delete User File

Press to display the Delete User File dialog box. The Delete User File dialog box allows any one file type or all file types to be deleted from the SiteHawk. See [Figure 25](#).

For procedure to delete files see [“Data Save and Export” on page 39](#).

Figure 25 Delete User File dialog box



Site Name

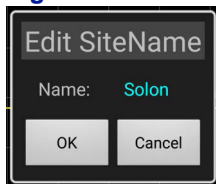
Press to toggle ON or OFF, when set to ON the site name will be included on all screen shots.

After Site Name is set to ON, an Edit SiteName dialog box will be displayed each time a screen shot is taken. See [Figure 26](#).

The site name must be entered the first time a screen shot is saved.

Note: The default setting for the Site Name option is OFF. If the reset function is executed on the SK-4500, the Site Name option is reset to OFF.

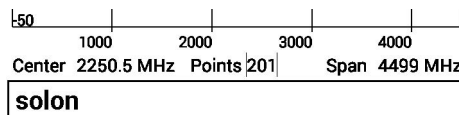
Figure 26 Site Name Dialog Box



The site name will appear at the bottom of the sweep display screen shot. See [Figure 27](#).

If no site name was entered NULL will appear in place of the site name.

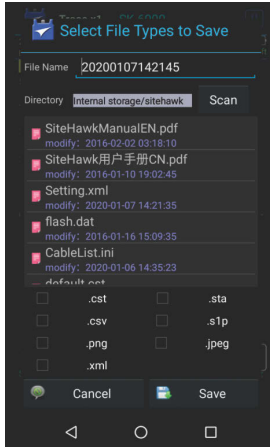
Figure 27 Site Name Screenshot



Save Multiple Files

The Save Multiple Files menu allows several file types to be saved in one operation, using the same file name for each file type. The menu contains file type selection boxes and file name option. For more details, see ["Save Files on SiteHawk" on page 40](#).

Figure 28 Save Multiple Files



RESET Icon

The reset menu will reset the SiteHawk to default settings. All current data is cleared including calibration, and all menus are reset to default. Saved data is not affected by a reset.

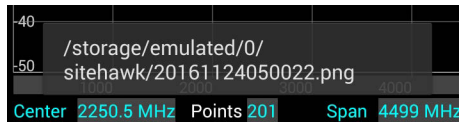
1. Press the Menu icon.
2. Press RESET. A Reset dialog will open, click OK to confirm reset.

PNG Icon

Pressing PNG will save the current sweep display area as an image with a PNG file type extension. The save path and filename will briefly be displayed at the bottom of the screen. See [Figure 29](#).

Note: If the Site Name option is set to ON an Edit SiteName dialog box will be displayed each time screen shot is taken. See [Figure 26](#).

Figure 29 PNG Screenshot



SYS Menu

SYS menu is accessed by pressing the Menu icon, then pressing the SYS icon.

Figure 30 SYS Menu



System Settings

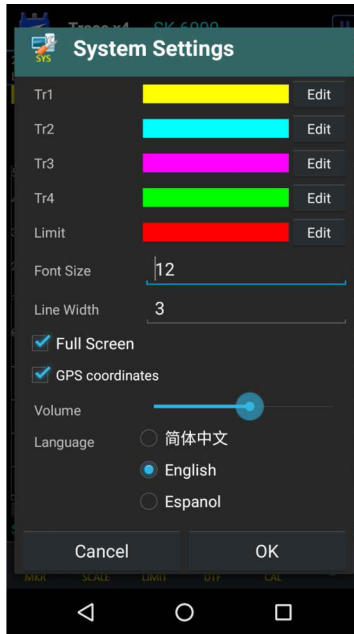
Press the SYS icon on the SYS menu to open the System Settings dialog, [Figure 31 on page 38](#). The System Settings dialog allows the user to change system display settings. The full menu is best viewed with the SiteHawk in the vertical position.

User options include:

- Change Trace color
- Change limit Line color
- Change font size
- Change line widths
- Toggle Full Screen on and off
- Toggle display of GPS coordinates on and off
- Adjust the volume
- Select Language

Note: *GPS coordinates, when selected, will appear on the display along with the date and time, see ["User Interface" on page 7](#).*

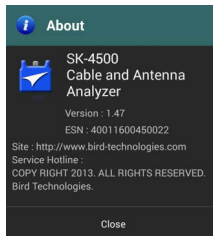
Note: *Location services must be set to On for the SiteHawk to display latitude and longitude data. See ["Accessing Communication Services" on page 51](#).*

Figure 31 System Settings**EXIT**

Press the exit icon on the SYS menu to close the SiteHawk application.

About Screen

Press the information icon on the SYS menu opens the About Screen. The About screen displays the software version and the device serial number.

Figure 32 System About

CHAPTER 6

DATA SAVE AND EXPORT

Saving and Recalling SiteHawk Status Data

SiteHawk status, calibration result, and tracing data can be saved to the instrument, and can be recalled to be displayed on the sweep display area.

The parameters for this instrument setting include: scale, trace, cursor and analysis. These parameters are saved in the status files.

CAUTION

Do not connect the unit to a PC USB port.
File transfer must be done using a USB Drive.

Trace Data in CSV File Format

SiteHawk can track data of a single trace and then save the data as a comma separated values (CSV) file. The CSV file contains a list of data separated by commas. The current format and response trajectory under the incentive value is stored in the CSV file.

Trace data is saved in the following format to the *.CSV file:

F[0],	Data1,	Data2
F[1],	Data1,	Data2
	. . .	
F[N],	Data1,	Data2

F[n] = Frequency about point N.

Data1 = Trace response value, Real part

Data2 = 0, Imaginary part

Trace Data S1p File

SiteHawk can save the parameters to the S1p file. The S1p file contains the frequency value and S-parameter. S1p files are used to store a single port parameter. Only one path of data is saved to the file.

s1p files are used for importing into the SiteHawk PC Tool software. Once imported, Markers and limit lines can be added, the scaling can be modified, and reports can be generated.

The file contains a comments, title and track data lines. Comments are indicated using an exclamation "!" mark. Title of the start of the data is indicated using a pound "#" sign with the data following.


```

! Comments
# Hz S FMT R Z0
F[1] {S11}' {S11}"
F[2] {S11}' {S11}"
. . .
F[N] {S11}' {S11}"

```

Hz—frequency measurement unit (kHz, MHz, GHz)

FMT—Data Format

RI—Real part and Imaginary part

MA—Linear Amp and Phase

DB—Log Amp (dB) and Phase

Z0—reference impedance

F[n]—Frequency about point N

{...}'—{(RI) |(MA) |(DB)}

{...}"—{(RI) |(MA) |(DB)}

Save Files on SiteHawk

The SiteHawk Analyzer automatically names files using a time-date format, this can be changed during the save operation.

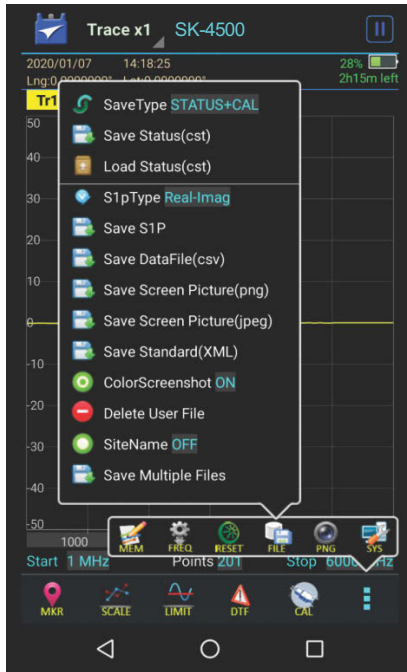
Figure 33 SiteHawk File Names

DATE	TIME
YYYYMMDD	HHMMSS
20151017	092532.S1p

Saving Files

1. Press the Menu icon.
2. Press the FILE icon to display the file menu. See [Figure 34](#).

Figure 34 File Menu

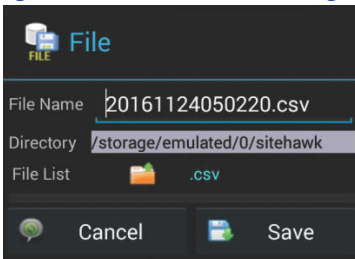


3. Select the format of the saved file:
 - Data can be saved as cst or sta trace data.
 - Data can be saved as a S1p file.
 - Data can be saved as a datafile (.csv).
 - Screenshots can be saved as .png or .jpeg.
 - Save Multiple Files (select multiple file types to save as a group).
4. Press appropriate Save icon (each save type has its own save button).

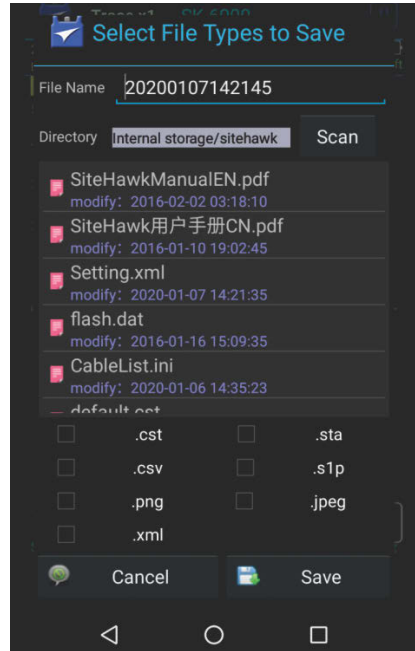
Note: Unless a custom name is entered, a default filename will be automatically generated. This file will be saved to the internal memory of the unit.

5. Change the file name, if desired. See [Figure 35 on page 42](#).
6. If Save Multiple Files was selected, select checkboxes for all file types to save as a group.
7. Press Save.

Figure 35 File Save Dialog



Individual File
Save Dialog



Multiple Files
Save Dialog

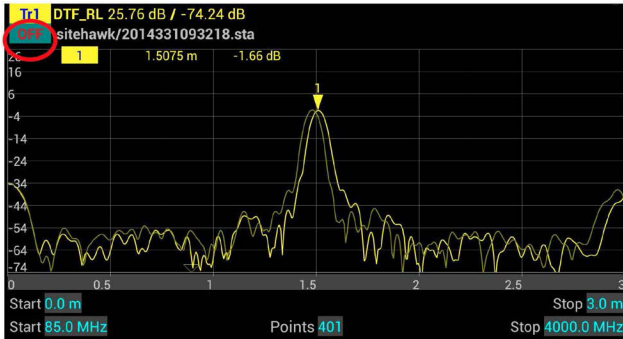
Recall Trace Data

Data in sta or cst data files can be recalled and displayed with the current data trace.

1. Press the Menu icon.
2. Press the FILE icon to display the file menu. See [Figure 34](#).
3. Press the Save Type to select file type STATUS+CAL (cst) or STATUS (sta).
4. Press Load.
5. Select the data file from the list.
6. Press Load. See [Figure 36, page 43](#).

Note: *The active and the recalled trace data will be displayed together in the sweep display area. In the example, Tr1 is the active trace, the recalled trace data is indicated with OFF and the file name.*

Figure 36 Recall Sta Data and Running Data



7. Press OFF to remove the recalled trace data.

Deleting SiteHawk Stored Data Files

This procedure can be used to delete any data files stored by the SiteHawk App.

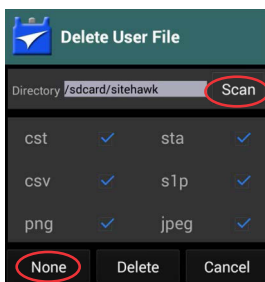
1. Press the Menu icon.
2. Press the FILE icon to display the file menu. See [Figure 34](#).
3. Press Delete User File.

4. Select Directory containing files to delete.

Note: The default directory (folder) displayed in the Delete User File dialog box is the default save folder, there is no need to select a different folder if the default folder was used to save files. Skip to [step 5](#).

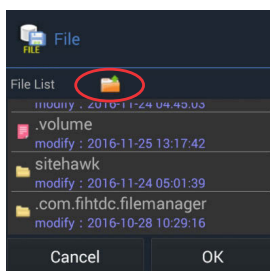
- a. Press SCAN. See [Figure 37](#).

Figure 37 Delete User File Dialog Box



- b. Select desired folder in the File List or press file folder icon to browse for the desired folder. See [Figure 38](#).

Figure 38 Directory Selection



Note: Only folders may be selected in the File List. This dialog box is used to select the folder containing the files to be deleted.

- c. Press OK.
5. Select the file types to delete.

Note: All file types are selected initially, any file type selected with a check mark when DELETE is pressed will cause ALL the files of that file type to be deleted.

- a. To deselect all file types, press NONE. See [Figure 37](#).
- b. Press the check box next to each file type to select those files for deletion.

6. Press DELETE.

Data Transfer Function

Data transfer from the SK-4500 may be accomplished using a USB Drive or via Bluetooth transfer. For instructions on how to make transfers see "[Data Transfer via USB Drive](#)" on page 45 or "[Data Transfer via Bluetooth](#)" on page 49.

Data Transfer via USB Drive

Data can be transferred from or to the SiteHawk internal memory with the use of an external USB drive and the USB adapter (supplied).

CAUTION

Do not connect the unit to a PC USB port.
File transfer must be done using a USB Drive.

1. Connect the USB drive to the USB adapter, then connect the USB adapter to the USB-C port at the bottom of the unit.

Note: *There may be minor differences between the screens shown in the procedure and those displayed on the device.*



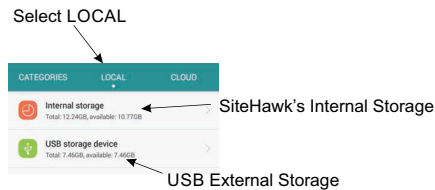
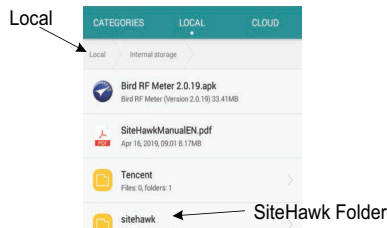
2. Tap the Apps icon  on the SiteHawk display.
3. Tap the File Manager icon .
4. Tap Local, then select Internal Storage (SiteHawk Internal storage Local) from the File Manager menu. See [Figure 39](#).

Figure 39 File Selection



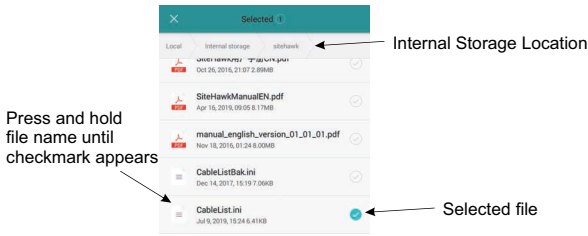
5. Navigate to the location of the file. See [Figure 40](#).

Figure 40 Folder Navigation



- Press and hold to select the file to be copied. If more than one file is to be copied, tap the additional files to select and display check marks.

Figure 41 Selecting files




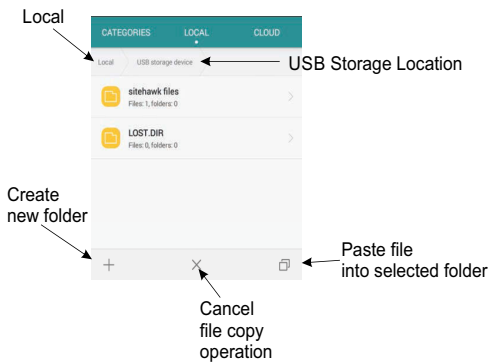
- Tap the Copy icon. 
- Tap Local at the top of the screen, then select USB Storage device. See [Figure 39](#).
- Navigate to the USB storage device. See [Figure 42](#).

Figure 42 USB Storage





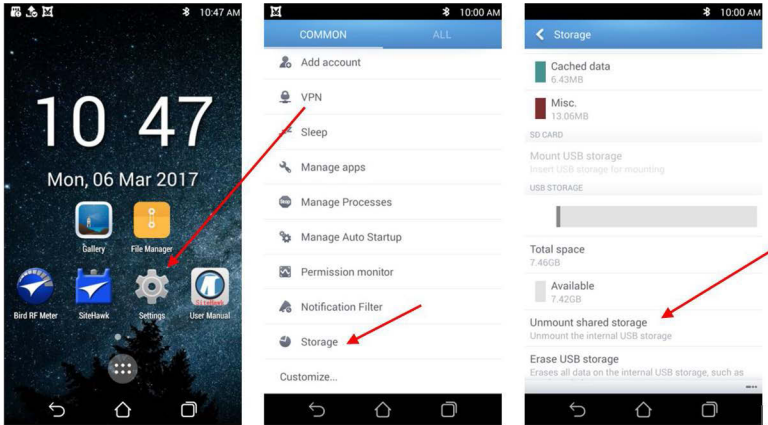
- If necessary, select or create a folder on the USB drive, then select the folder.
- Tap the Paste icon  to save the file onto the USB drive.
- Exit the File Manager.
- Tap the Apps icon  on the SiteHawk display.
- Tap Settings icon. See [Figure 43 on page 47](#).
- Tap Storage, if the storage option is not available see "[Display Storage Option in Settings](#)" on page 48.

Figure 43 Unmount USB Storage



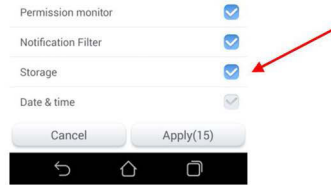
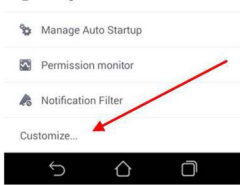
16. Scroll to USB storage, and tap Unmount shared storage.
17. Tap OK.
18. You may now remove the USB Drive.

Display Storage Option in Settings

If the storage option is not visible in the Settings menu perform the following:

1. Tap Settings on the Home Screen. See [Figure 43 on page 47](#).
2. Tap Customize, see [Figure 43](#).

Figure 44 *Customize Setting Menu*



3. Select Storage.
4. Tap Apply.
The Storage option should now be visible in the Setting menu.

Data Transfer via Bluetooth

Files may be transferred to/from the SiteHawk using the following steps.



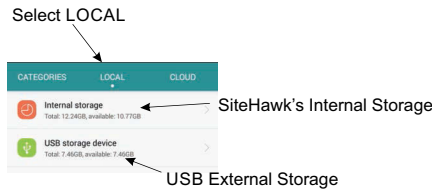
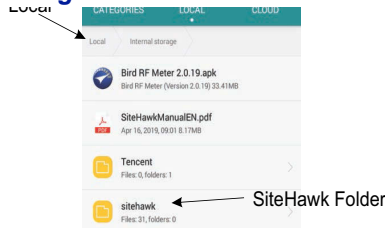
1. Press Home key on the SiteHawk display.
2. Select Settings.
3. Turn on Bluetooth.
4. Tap the Apps icon  on the SiteHawk display.
5. Tap the File Manager icon .
6. Tap Local, the select Internal Storage (SiteHawk Internal storage Local) from the File Manager menu. See [Figure 39](#).

Figure 45 File Selection



7. Navigate to the location of the file. See [Figure 40](#).


Figure 46 Folder Navigation



8. Press and hold to select the file to be copied. If more than one file is to be copied, tap the additional files to select and display check marks.

Figure 47 Selecting files



9. Tap the menu icon. 

10. Select Share from the menu.
11. Select Bluetooth option for sharing.
12. Scan for available devices.

Note: *You may need to make the destination device visible to other devices in it's setting's menu.*

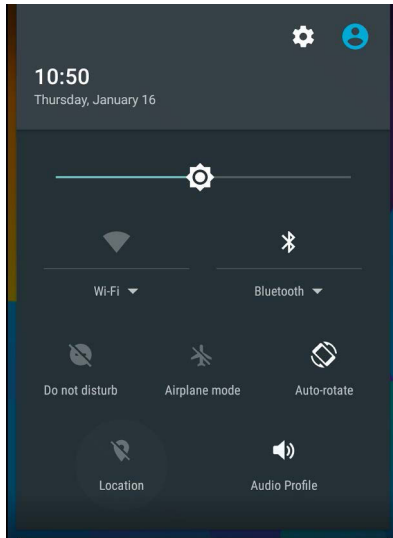
13. Select the destination device from the devices listed.
14. On the destination device, tap ACCEPT.
15. Verify transfer is complete.

SiteHawk Communications Settings

The SiteHawk utilizes WiFi, Bluetooth, and GPS to perform the various functions described in the previous sections.

These communications functions may be turned on and off using the pull-down notification area at the top of the SiteHawk's display area, See [Figure 48](#).

Figure 48 SiteHawk Pull-Down Notification Menu



Accessing Communication Services

1. Swipe your finger down from the top of the display screen to access the notification area.
2. Tap the service Icon to start (or stop) the service
 - a. Location: tapping location icon turns location services off or on. A slash through the icon indicates the service is OFF as shown in [Figure 48](#).
 - b. WiFi: tapping WiFi icon turns WiFi off or on. Tap the dropdown below the icon to select a WiFi network and enter the password.
 - c. Bluetooth: tapping Bluetooth icon turns Bluetooth off or on. Tap the dropdown below the icon to select a Bluetooth device for pairing.

CHAPTER 7

MAINTENANCE

Cleaning

Clean the SiteHawk Analyzer only with a soft cloth dampened with mild detergent and water. Do not use any other type of cleaning solution.

CAUTION

Do not touch the center pin of the Antenna Test Port with bare hands, water, or emery cloth. Otherwise, damage may occur to the connectors surface.

- Clean the connector using a cotton swab dipped into an isopropyl alcohol solution.
- Ensure connectors are completely dry before making cable connections.

Charging the Battery

The internal battery pack will automatically recharge when the SiteHawk Analyzer is connected to the AC adapter.

Recharging time, from a full discharge, is approximately 5 hours with the unit powered off.

CAUTION

Only use the supplied AC adapter to charge the unit.

The unit cannot be charged through a USB port (i.e. from a laptop).

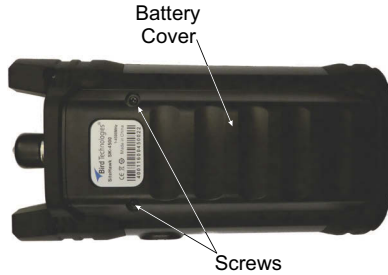
Charging from a power source other than the supplied charger may damage the battery.

Replacing the Battery

The internal battery pack

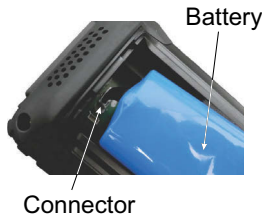
1. Remove two screws and remove battery access cover.

Figure 49 Battery Access



2. Carefully disconnect battery cable from connector on SK-4500.

Figure 50 Battery Removal



3. Connect new battery cable to connector in the battery compartment.
4. Install battery access cover and two screws to secure cover.
5. Charge the battery.

Device Calibration

It is recommended that an instrument calibration be performed by a certified service provider at nominal three year intervals.

Contact Bird Electronic for more information.

Storage

Store the SiteHawk Analyzer in an enclosed case and in an environment that does not exceed values listed in the Specifications section.

Ensure that the equipment is stored away from dust, acidic and alkaline environment, explosive gas, and other causes of corrosion.

Edit Cable List

The Cable List contains a list of known cable values. These procedure provide the steps necessary to edit the Cable List and select Cable Lists. The Cable List that is preloaded on the SiteHawk is named CableList.ini.

Edit Cable List on SiteHawk

Add Cable to Cable List

Note: cables in the default list cannot be changed using this method.

1. Press DTF icon.
2. Press CableList option to display the Cable List. See [Figure 51](#).

Figure 51 Cable List Dialog Box



	CableName	Velocity	CableLoss dB/m	Frequency MHz
93	WBC-500R	0.86	0.1072 dB/m	1000 MHz
94	WBC-600P	0.87	0.0285 dB/m	1000 MHz
95	WBC-600R	0.87	0.0865 dB/m	1000 MHz
96	New-Cable	1	0 dB/m	1000 MHz

Buttons: Add, Delete, OK, Save, Recall, Cancel

3. Press Add button to add new cable.
4. Scroll to the bottom of the Cable List to see the new entry.
5. Press each cell for Cable name, Velocity, Cable Loss and Frequency to enter the new cables information.

Figure 52



6. After cable information is entered press OK.

Delete Cable from Cable List

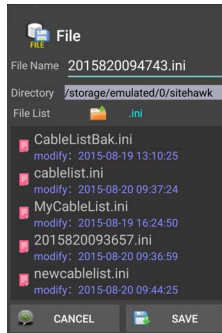
Note: Only cables added by the user may be deleted using this method.

1. Press DTF icon.
2. Press CableList option to display the Cable List. See [Figure 51](#).
3. Scroll to the bottom of the Cable List to see the cable to be deleted.
4. Select the cable to be deleted.
5. Press Delete button to delete cable.

Save Cable List

1. Press DTF icon.
2. Press CableList option to display the Cable List. See [Figure 51](#).
3. Press Save

Figure 53 Save Cable List Dialog Box

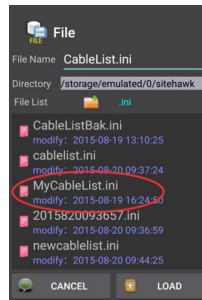


4. Press File Name to give the Cable List a unique filename.
5. Press SAVE to save the Cable List.

Recall Cable List

Note: This procedure is used to load a Cable List different from the Cable List currently displayed.

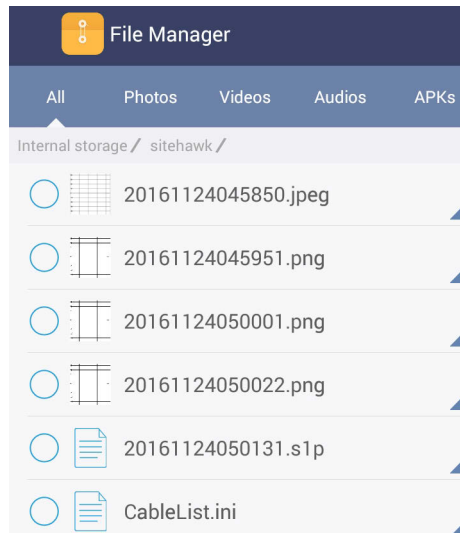
1. Press DTF icon.
2. Press CableList option to display the Cable List. See [Figure 51](#).
3. Press the Recall button. See [Figure 54](#).

Figure 54 Recall Cable List Dialog Box

4. Select the Cable List to Recall.
5. Press LOAD.
6. Select a cable in the list and press OK.

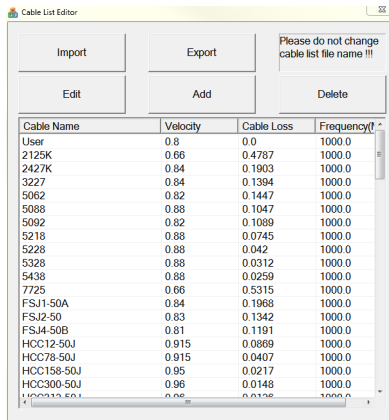
Edit Cable List on a PC

1. Download the Cable List Editor from SiteHawk page on the Bird Website, and save on a PC.
2. Copy the file CableList.ini from the SiteHawk folder on the SiteHawk. See [“Data Transfer Function” on page 45](#).



3. Save the CableList.ini file on the PC in the same folder with the Cable List Editor.
4. Double Click the CableListEditor.exe to launch the editor.
5. Click Import and select CableList.ini and click Open. See [Figure 55](#).

Figure 55 Cable List Editor

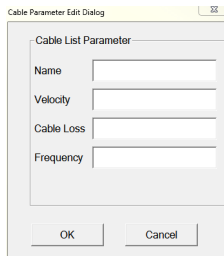


- Click Add to add a new cable or select an existing cable to change and click Edit.

Note: Any cable may be deleted by selecting the cable in the list and clicking Delete.

- Enter the cable information into the Cable Parameter dialog box. See [Figure 56](#).

Figure 56 Cable Parameter Edit Dialog



- Click OK
- Repeat [step 6](#) through [step 8](#) until all changes are complete.
- Once all changes are complete click Export.

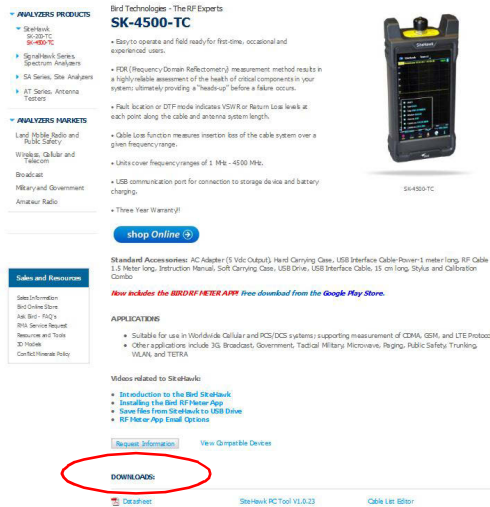
Note: The Cable List name can be the same as the default or may have a unique name.

- Name the Cable List and click Save.
- Copy the updated Cable List to a USB drive.
- Exit the SiteHawk App on the SiteHawk Analyzer.
- Copy the updated CableList.ini file to the SiteHawk and save in the original Cable List folder. See [“Data Transfer Function” on page 45](#).

15. Launch the SiteHawk App.
16. Load the updated Cable List. See [“Recall Cable List” on page 55.](#)

Firmware Update

1. Go to <http://www.birdrf.com/Products/Test and Measurement/Analyzers/Cable-Antenna-Analyzers/>
2. Scroll down to the Downloads.
3. Click on the Firmware link.



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SK-4500-TC

- Easy to operate and field ready for first-time, occasional and experienced users.
- FDR (Frequency Domain Reflectometry) measurement method results in a highly reliable assessment of the health of critical components in your systems ultimately providing a “heads-up” before a failure occurs.
- Full location or DTF mode indicates VSWR or Return Loss levels at each point along the cable and antenna system length.
- Cable Loss Function measures insertion loss of the cable system over a given frequency range.
- Ultra-wide frequency ranges of 1 MHz – 4500 MHz.
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- Three Year Warranty!

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Standard Accessories: AC Adapter (5 Volt Output), Hard Carrying Case, USB Interface Cable-1 meter long, RF Cable - 1.5 Meter long, Instruction Manual, Soft Carrying Case, USB Drive, USB Interface Cable, 35 on long, Stylus and Calibration Combo

Now includes the BIRD RF FINDER APP! Free download from the Google Play Store.

APPLICATIONS

- Suitable for use in 100+ mobile Cellular and PCS/DCS systems supporting measurement of CDMA, GSM, and LTE protocols.
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Videos related to SK4500:

- Introduction to the Bird SK4500
- Installing the Bird RF Finder App
- Save My Files to Backup to USB Drive
- RF Meter App Email Options

[Request Information](#) [View Compatible Devices](#)

DOWNLOADS

[DataSheet](#) [SiteHawk RC Tool V1.0.23](#) [Cable List Editor](#)

Note: Ensure you are downloading the firmware for correct SiteHawk model.

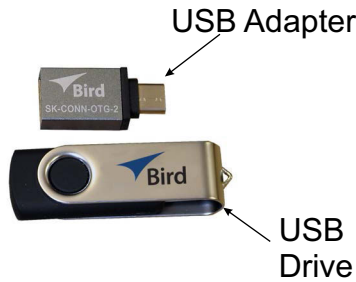
4. Download the SiteHawk-Firmware-XXX.apk update file.
5. Connect the USB drive to the PC.

CAUTION

Do not connect the unit to a PC USB port.
File transfer must be done using a USB Drive.

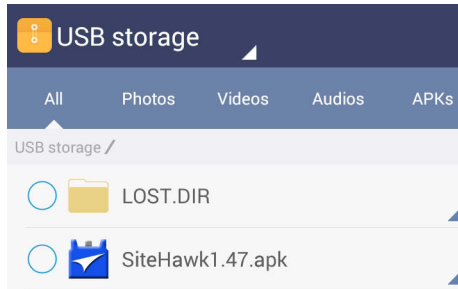
6. Transfer the SiteHawk-Firmware-XXX.apk update file to the USB drive.
7. Remove the USB drive.
8. Connect the USB drive to the USB adapter. See [Figure 57 on page 59.](#)
9. Connect the USB adapter to the SiteHawk Analyzer.

Figure 57 USB Drive connections



10. Turn on the SiteHawk Analyzer.
11. Select “File Manager”.
12. Select “External USB storage”.

Figure 58 APK file selection



13. Select SiteHawk-Firmware-XXX.apk.
14. Follow the Installation instructions on the unit.

Customer Service

Any maintenance or service procedure beyond the scope of those in this chapter should be referred to a qualified service center.

If the unit needs to be returned for any reason, request an Return Material Authorization (RMA) through the Bird Technologies website. All instruments returned must be shipped prepaid and to the attention of the RMA number.

Bird Service Center

30303 Aurora Road
Cleveland (Solon), Ohio 44139-2794
Fax: (440) 248-5426
E-mail: bsc@birdrf.com

For the location of the Sales Office nearest you, visit our Web site at:

<http://www.birdrf.com>

APPENDIX I

SITEHAWK ANALYZER DEFAULT SETTINGS

Description	Default Setting
Touchstone Data Format	RI - Real-Imaginary
Allocation of Channels	1
Active Channel Number	1
Marker Value Identification Capacity (Stimulus)	8 digits
Marker Value Identification Capacity (Response)	5 digits
Vertical Divisions	10
Traces per Channel	1
Active Trace Number	1
Number of Sweep Points	201
Stimulus Start Frequency	1 MHz
Stimulus Stop Frequency	4.5 GHz
Stimulus IF Bandwidth	1 kHz
Sweep Range Setting	Start / Stop
Trigger Mode	Continuous
Table of Calibration	Coefficients Empty
Error Correction	ON
Trace Scale	10 dB/division
Reference Level Value	0 dB
Reference Level Position	5 Div
Phase Offset	0°
Trace Display Format	Return Loss (dB)
Maximum Distance	1.49 m
Time Domain Kaiser Window	Normal
Number of Markers	0

LIMITED WARRANTY

All products manufactured by Seller are warranted to be free from defects in material and workmanship for a period of three (3) years, unless otherwise specified, from date of shipment and to conform to applicable specifications, drawings, blueprints and/or samples. Seller's sole obligation under these warranties shall be to issue credit, repair or replace any item or part thereof which is proved to be other than as warranted; no allowance shall be made for any labor charges of Buyer for replacement of parts, adjustment or repairs, or any other work, unless such charges are authorized in advance by Seller.

If Seller's products are claimed to be defective in material or workmanship or not to conform to specifications, drawings, blueprints and/or samples, Seller shall, upon prompt notice thereof, either examine the products where they are located or issue shipping instructions for return to Seller (transportation-charges prepaid by Buyer). In the event any of our products are proved to be other than as warranted, transportation costs (cheapest way) to and from Seller's plant, will be borne by Seller and reimbursement or credit will be made for amounts so expended by Buyer. Every such claim for breach of these warranties shall be deemed to be waived by Buyer unless made in writing within ten days from the date of discovery of the defect.

The above warranties shall not extend to any products or parts thereof which have been subjected to any misuse or neglect, damaged by accident, rendered defective by reason of improper installation or by the performance of repairs or alterations outside of our plant, and shall not apply to any goods or parts thereof furnished by Buyer or acquired from others at Buyer's request and/or to Buyer's specifications. Routine (regularly required) calibration is not covered under this limited warranty. In addition, Seller's warranties do not extend to the failure of tubes, transistors, fuses and batteries, or to other equipment and parts manufactured by others except to the extent of the original manufacturer's warranty to Seller.

The obligations under the foregoing warranties are limited to the precise terms thereof. These warranties provide exclusive remedies, expressly in lieu of all other remedies including claims for special or consequential damages. SELLER NEITHER MAKES NOR ASSUMES ANY OTHER WARRANTY WHATSOEVER, WHETHER EXPRESS, STATUTORY, OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS, AND NO PERSON IS AUTHORIZED TO ASSUME FOR SELLER ANY OBLIGATION OR LIABILITY NOT STRICTLY IN ACCORDANCE WITH THE FOREGOING.