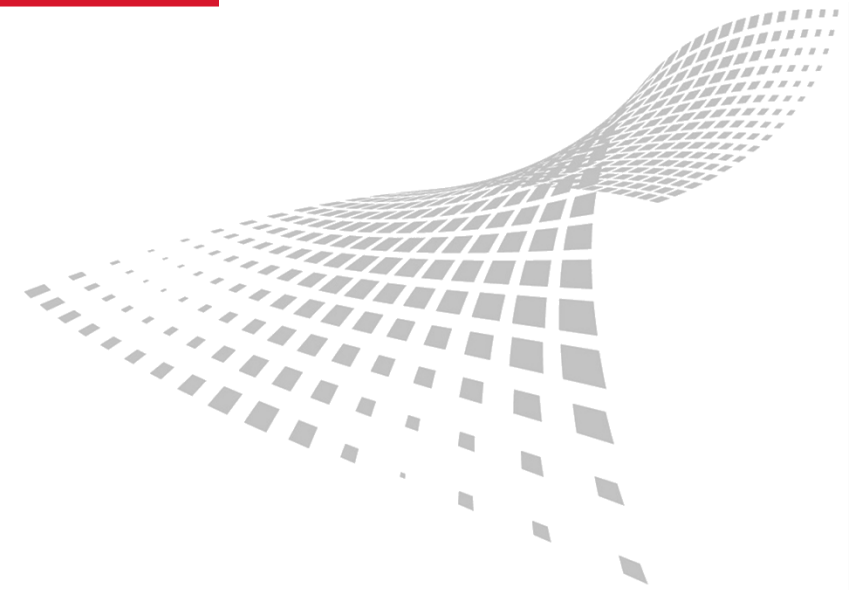


Handheld Cable & Antenna Analyzer

# SiteHawk

Transcom Instruments



# What Does Cable & Antenna Analyzer Do?



- Tests the overall integrity of an antenna system installation
- Verifies antenna system components meet manufacturer's design specifications
- Verifies the antenna system meets the system engineer's design specifications
- Pinpoints the location of antenna system problems prior to usage

# Overview of SiteHawk



SiteHawk is the world first hand-held intelligent cable and antenna analyzer powered by Android operating system and high-resolution touch screen. It is small, lightweight and easy to carry. SiteHawk can be used for testing the matching of the cable and antenna system, accurately evaluating system performance by measuring return loss, voltage standing wave ratio, cable loss and other parameters, and measuring the RF power with the optional ThruLine power sensor.



# Overview of SiteHawk



SK 200

# Product Features



- Support wider range of test frequency, cover most of application spectrum
- The world smallest and lightest (0.9kg) instrument allows one-hand operation
- High measurement speed, up to 1ms/point and immediate display of measurement result
- Maximum 1500 meters DTF Range
- Built-in battery can be constantly operating for 10 hours (SK-4500), and additional portable battery can be applied to further extend battery capacity
- High frequency resolution (1kHz), simultaneous sweeping of 3201 data points at the same time, and high frequency accuracy:  $2.5 \times 10^{-6}$
- HD color LCD screen, visible in sunlight and suitable for field work
- Built-in 16GB memory: measurement data can be shared via the WIFI cloud or recorded in the USB flash disk



**Industrial Grade Design:** By using integrated ergonomic design, SiteHawk is dust and water proof, and supports stable measurement in harsh environment. Temperature stability is up to 0.01dB/ °C. SiteHawk is the smallest and lightest cable and antenna analyzer in the world, with weight of only 0.9Kg including the battery.





**Engineering Accessories:** SiteHawk is provided with waterproof suitcase and portable soft bag, where the host and all accessories can be assembled to facilitate carrying.





**Ergonomic Design:** SiteHawk has anti-slip rubber protective cover helps to be held more comfortably. With built-in gravity sensor, SiteHawk can be easily operated as a regular cellphone that provide convenient testing environment.

**Powerful battery capability:** SiteHawk built-in battery supports 10 hours continuous operation (SK-4500). With external portable charger or battery, SiteHawk provides user a long and stable working environment.





SiteHawk is powered by Android operating system. Its operation interface is simple and user-friendly. Various kinds of professional software can be installed to expand the instrument performance. SiteHawk also supports external storage devices, Bluetooth communication and WIFI communication. Data can be flexibly shared via the built-in large-capacity memory and Internet “cloud” application. Data and cloud server can be synchronized and analyzed. With the built-in GPS function, location information can be recorded and tested, achieving the truly “integrated” test.





**Mass applications:** SiteHawk can be installed with multiple professional APPs to achieve various test functions and enhance the extension performance.

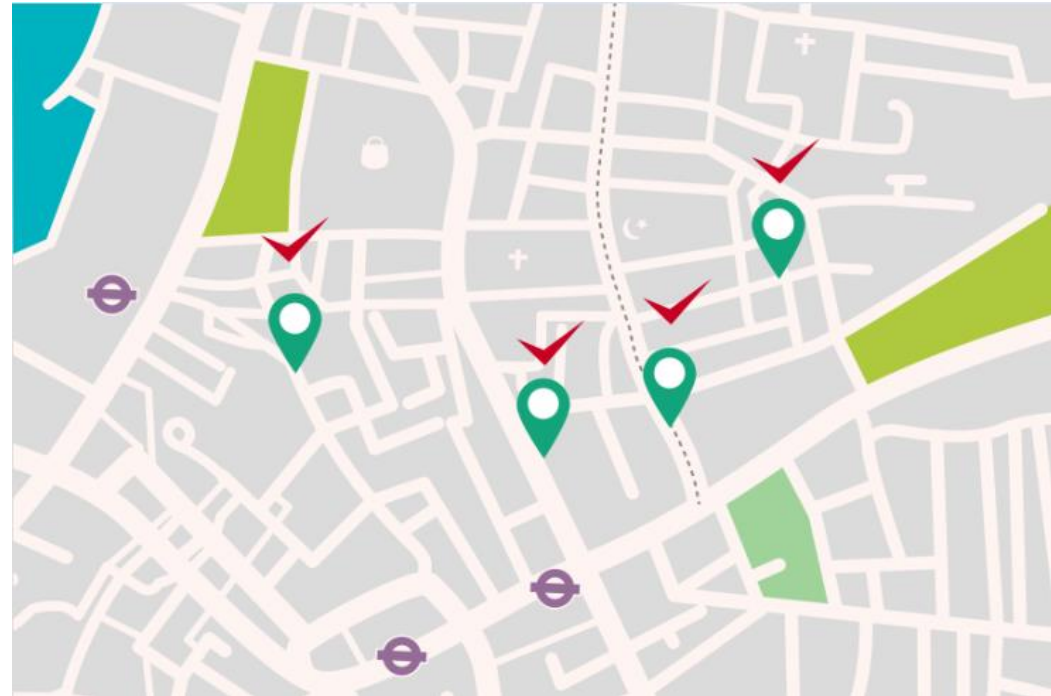
**Data Synchronization and Cloud Analysis:** With 16GB memory, SiteHawk is able to save thousands of screenshots or traces. Test records can be transmitted by Bluetooth, USB or WIFI cloud to synchronize and analyze data.

## Bird RF Meter App





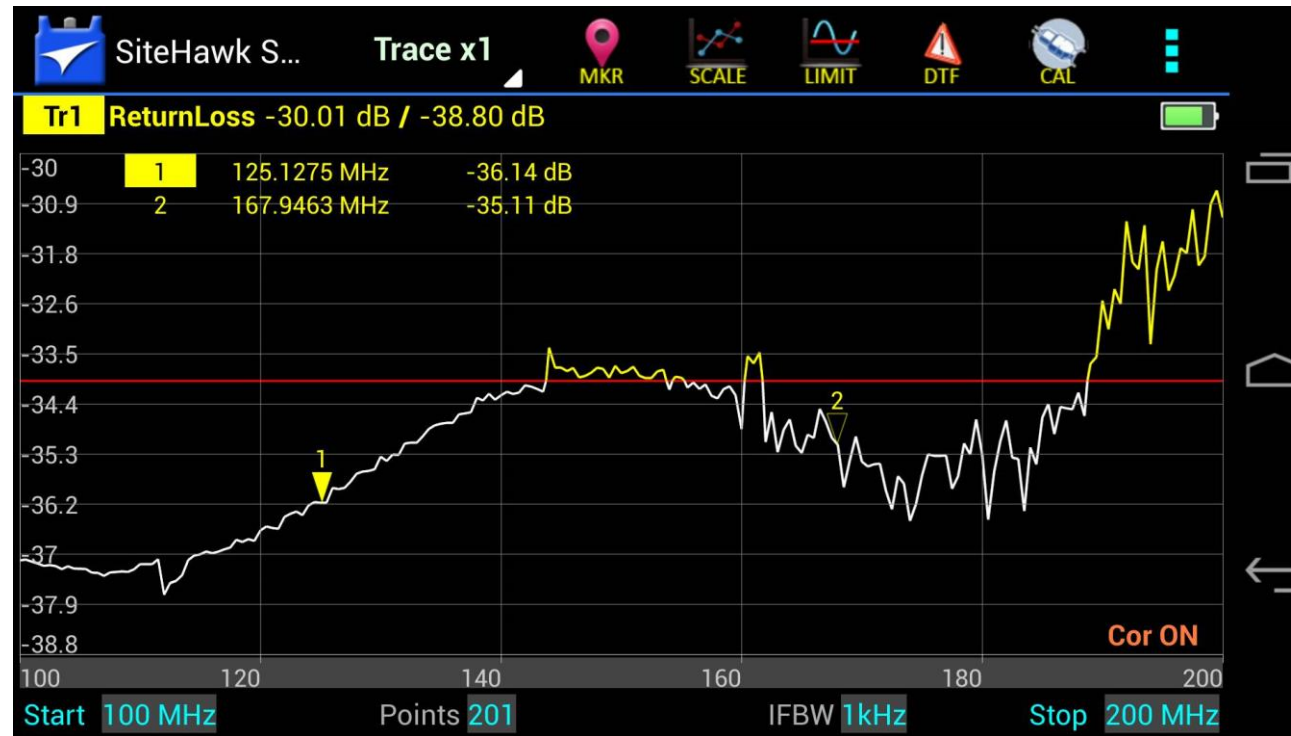
**GPS Positioning Function:** GPS option allows test and evaluation become visible. By recording the longitude, latitude, altitude and other location information, wrong analysis and measurement missing of positioning records of measurement site can be avoided, which ensuring the integrity of engineering test.



# Field Testing Functions

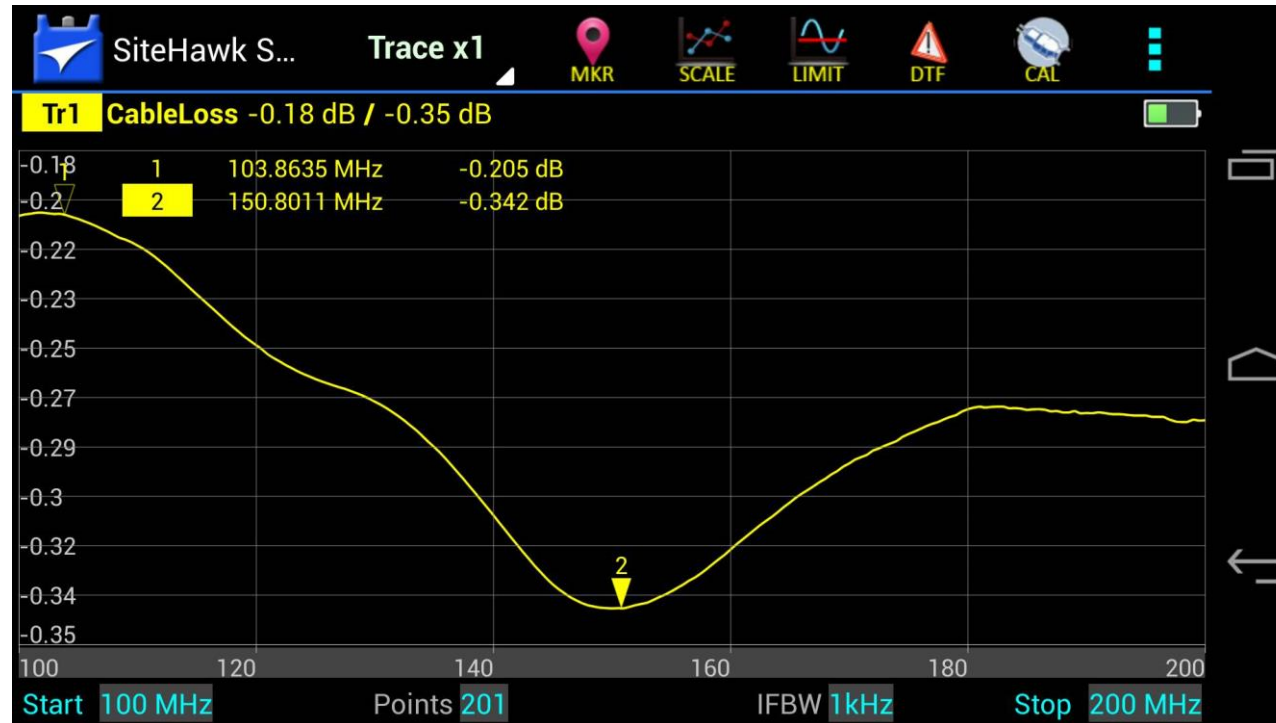


**Reflection characteristic measurement:** SiteHawk can be used for measuring reflection characteristic parameters based on frequency-domain reflection. Reflection characteristic parameters indicate specific matching of the antenna, feeder and other passive devices/systems. High-accuracy measurement results area shown in the VSWR or return loss form.





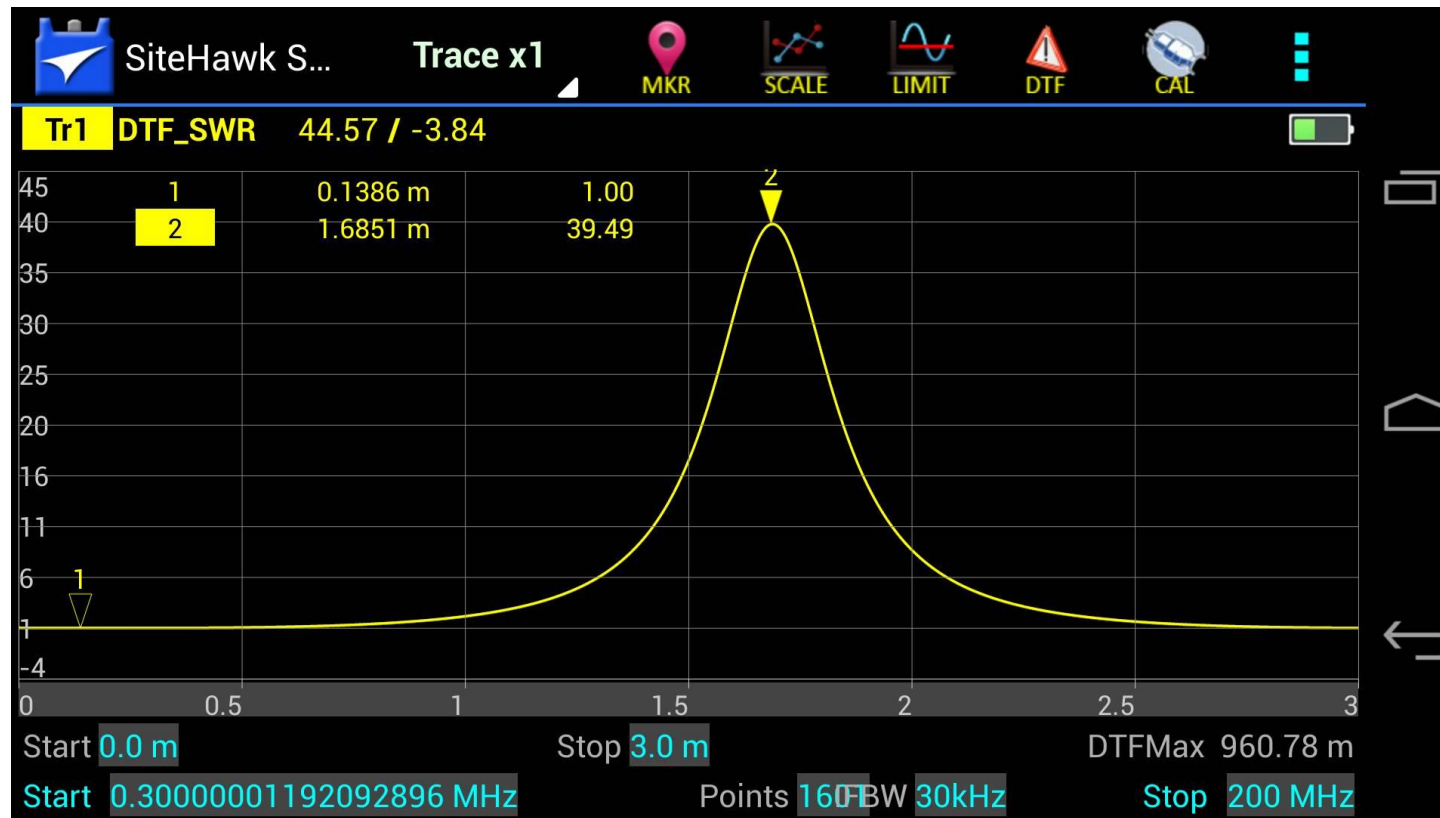
**Single-Port Cable Loss Measurement:** The cable insertion loss of the RF system has significant influence on power transmission characteristics. Poor cable loss also affects the overall matching of the antenna system. SiteHawk supports single-power cable loss measurement. With the built-in cable list, true results can be automatically calculated according to the rated attenuation of each cable, which is conducive to overall evaluation of the RF system.



# Field Testing Functions



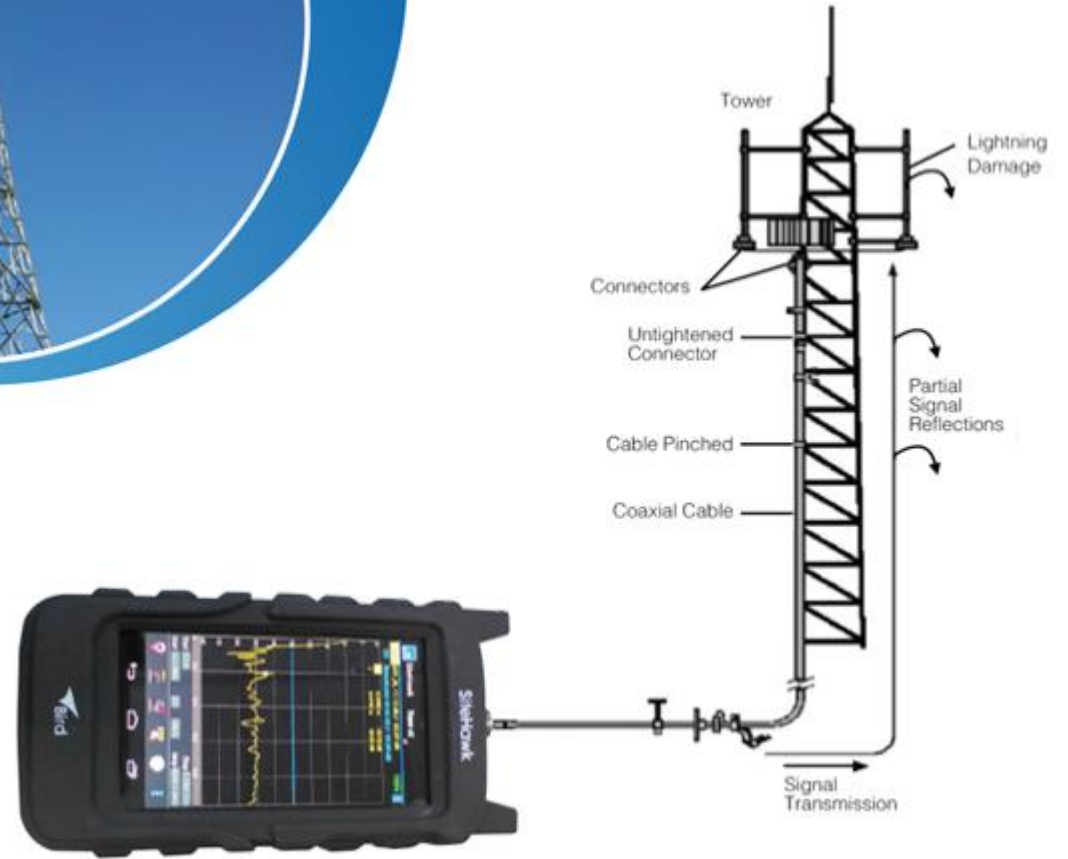
**DTF VSWR/Return Loss Measurement:** The DTF test is carried out to determine the specific positions of nonconforming cables, components and connectors of the cable system, in the form of VSWR or return loss change along with the distance, in order to eliminate faults and risks.





## Feeder and antenna system

**maintenance/installation:** When impedance of the antenna, feeder and other passive devices are not matched with each other or the impedance of the feeder and transmitter are not matched with each other, reflection will be caused as a result of high-frequency energy. In the case of poor return loss/VSWR, the transmitter will be damaged, the coverage area of the base station will be reduced, the call drop rate and blockage will be increased, and the data traffic rate will be decreased.





**RF power measurement:** For the antenna and feeder system, SiteHawk supports accurate measurement of RF power with the optional RF power meter. The actual RF energy in the current position of the system can be accurately obtained by means of through type power measurement, to evaluate actual operation of the system.

(Power sensors include Bird 7020, 7022, 5012D, 5014, 5015, 5015-EF, 5016D, 5017D, 5018D and 5019D).





# Flexible Test Solutions

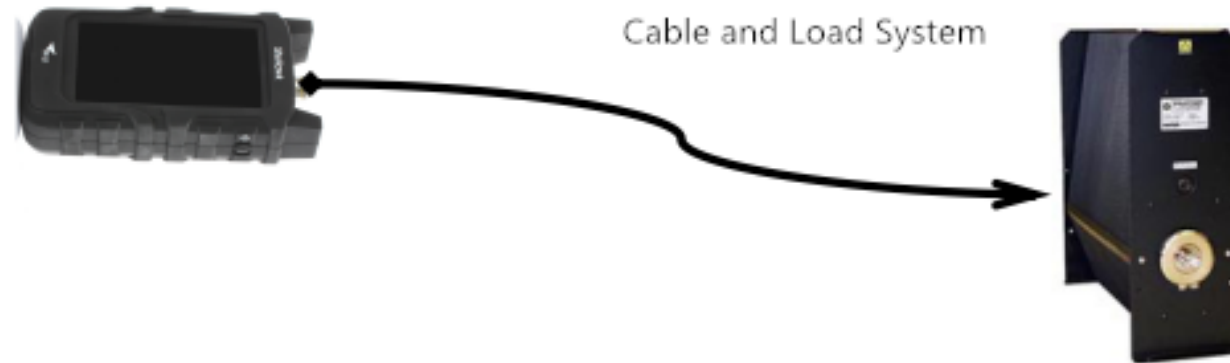


**Indoor distribution test:** For the indoor distribution system, SiteHawk can examine the reception and transmission states when combined with spectrum analyzer. The optional built-in signal source of SiteHawk can be used as a substitute of indoor distribution RF signal source. At the same time, relevant parameters such as the terminal channel power can be measured by the spectrum analyzer. SiteHawk is able to locate and measure faults of the indoor distribution system to effectively.





**Semiconductor calibration load/RF cable test:** If the impedance of the cable system does not match in the semiconductor calibration process, the transmitter output and semiconductor production quality will be affected. SiteHawk can be applied to rapidly and accurately evaluate the RF cable and load.



# Comparison

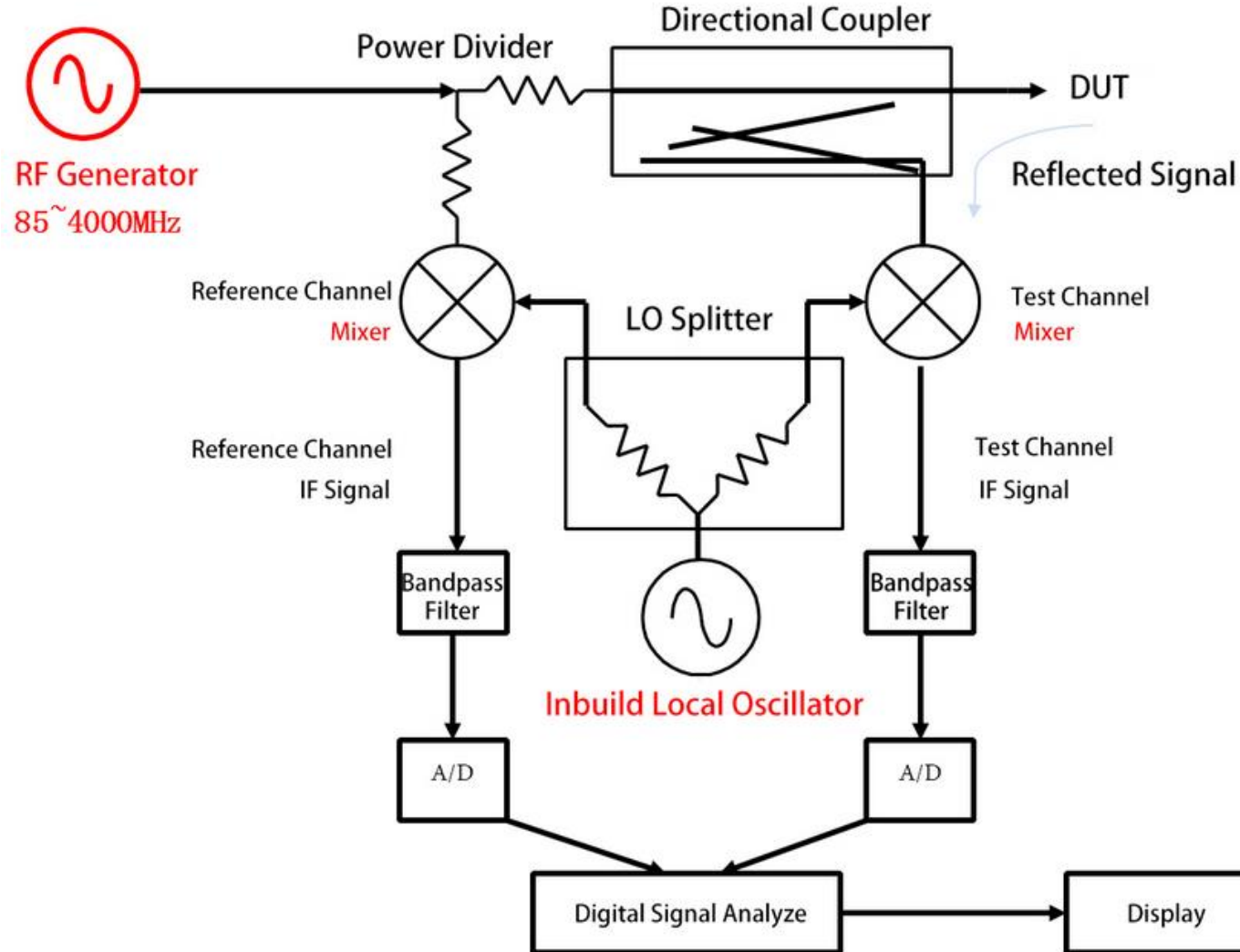


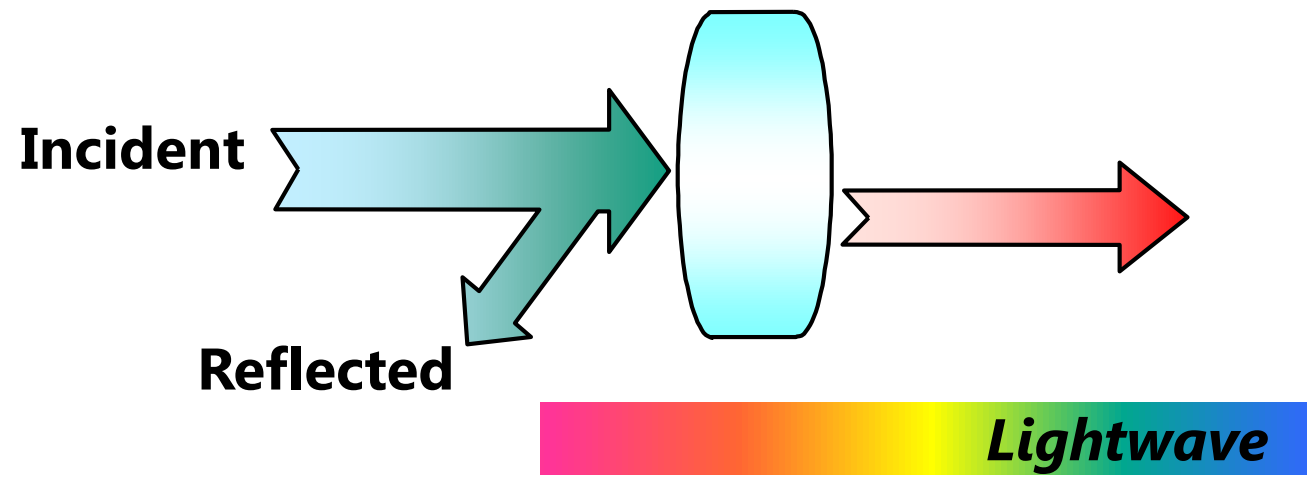
	Transcom SiteHawk SK-4500	Anritsu S331L	Agilent N933B
Frequency Range	1-4500MHz	2-4000MHz	25-4000MHz
Frequency Resolution	1kHz	1kHz	100kHz
Frequency Accuracy	±2.5ppm	±5ppm	±50ppm
Measurement Points	51, 101, 201, 401, 801, 1601, 3201	130, 259, 517, 1033	131, 261, 521
Measurement Speed	1ms/data point	1.5ms/data point(RL) 1.7ms/data point(DTF)	3.1ms/data point
Directivity	45dB	38dB(Electronic Calibration) 42dB(Mechanical Calibration)	42dB

# Comparison



	Transcom SiteHawk SK-4500	Anritsu S331L	Agilent N933B
Screen Resolution	1920*1080	800*482	640*482
Screen Size	5.5	7.05	6.5
Weight	0.9Kg	2Kg	2Kg
Operating System	Android	-	-
Operating Time	10 hours	8 hours	4 hours
Size	195mmx 90mm x 60mm	250 x 177 x 61mm	317 x 207 x 69mm
Traces	60000	1000 (Traces + Screenshots)	200
Screenshots	10000	1000 (Traces + Screenshots)	10







**No reflection**  
 (terminal impedance = **Z<sub>o</sub>**) **RL** =  $-20 \log(r)$

**Total reflection**  
 (terminal impedance = **Open, Short**)



**VSWR** =  $\frac{E_{max}}{E_{min}} = \frac{1 + r}{1 - r}$



**Reflection Coefficient**  $r = \frac{V_{reflect}}{V_{incident}}$





VSWR	Return Loss	Comments
1:1	$-\infty$	Perfect match. 100% of the power is delivered to the antenna (not possible)
1.43:1	-15dB	Very little reflected power. 96.84% of the power is delivered to the antenna (common goal for cellular carriers)
1.5:1	-13.98dB	Very little reflected power. 96% of the power is delivered to the antenna (common goal)
2:1	-9.54dB	88.9% of the power is delivered to the antenna.
10:1	-1.74dB	Very poor match. Only 33% of the power is delivered to the antenna.





- **Data points:** Increasing the number of data points increases the measurable distance
- **Span:** The larger the frequency span, the shorter the measurable distance. Narrowing the frequency span increases the measurable distance.

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

**Note:**  $N$  = Test points

$F_{min}$  = Start frequency

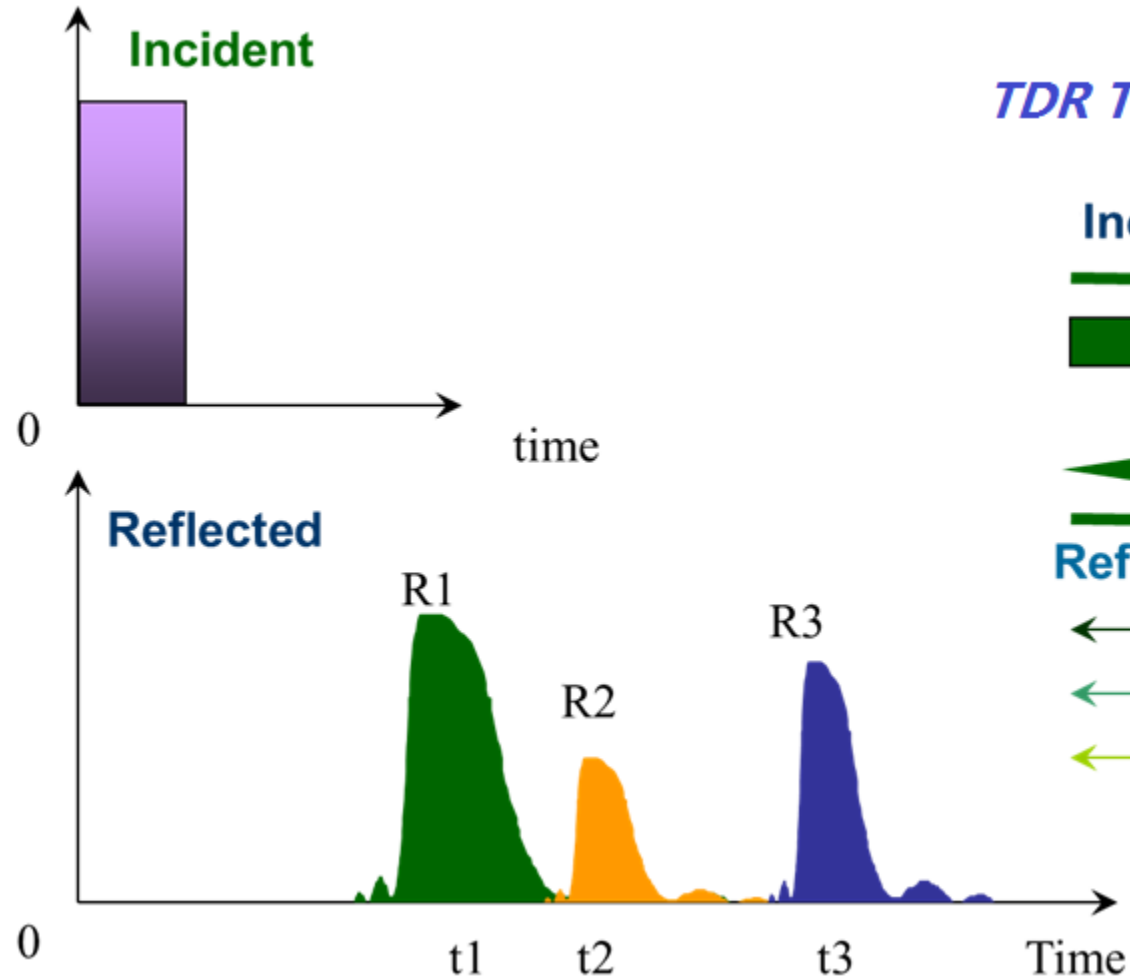
$F_{max}$  = End frequency

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

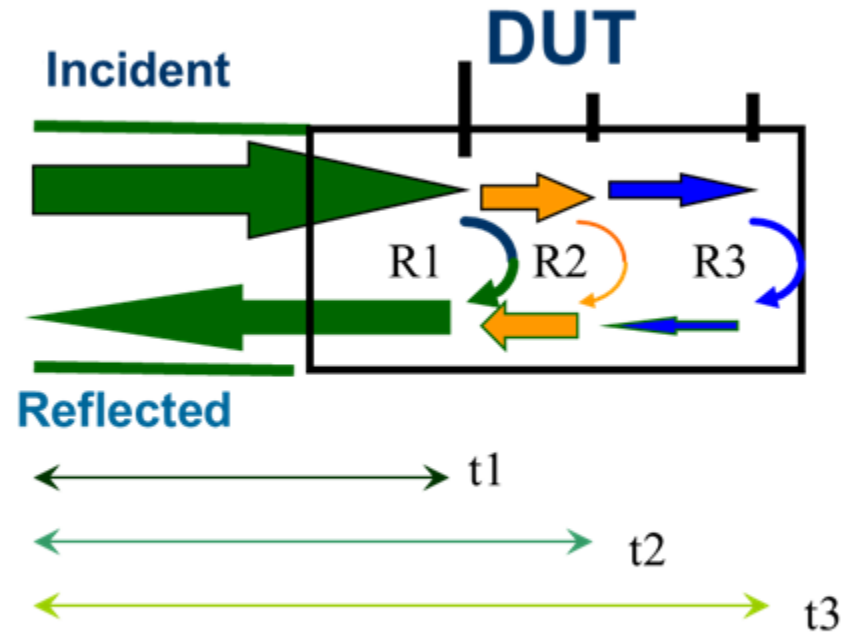
$$DTF_{max} = \frac{C \cdot V_p \cdot \Delta T}{2} = \frac{C \cdot V_p \cdot (N-1)}{2 \cdot (F_{max} - F_{min})}$$

**Note:**  $C$  = Speed of light

$V_p$  = Velocity of Propagation (cable)



## TDR Time domain reflection measurement



$$\text{Distance} = \text{Time} \times \text{Velocity}$$



# Preparing Today for 5G of Tomorrow



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