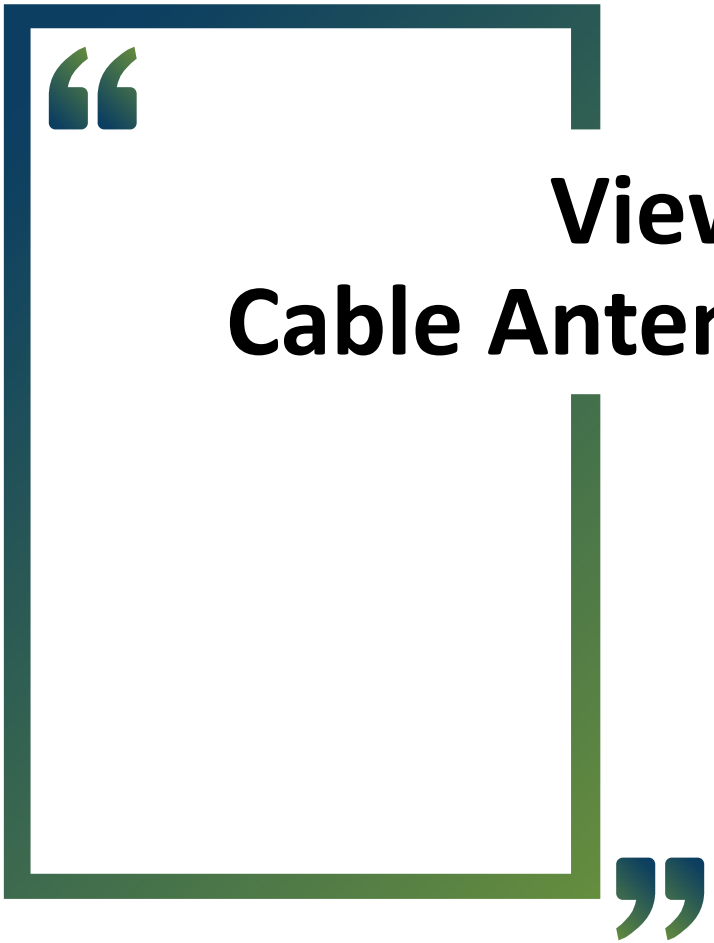
View900
Cable Antenna Analyzer



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REV. B

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Product Portfolio

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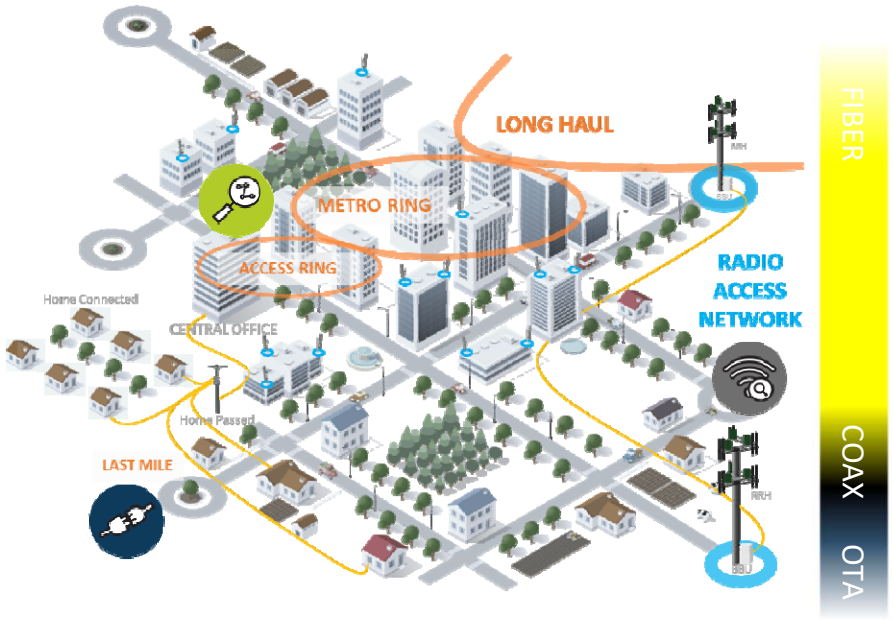
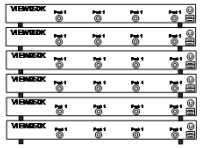
Delivering E2E Visibility and Intelligence



INNO Instrument provides a full range of solutions for wireless telecommunication network including RF instruments for the installation, maintenance, and troubleshooting to meet network demands

Product Portfolio

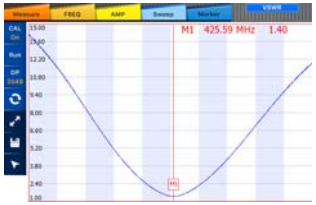
Fusion Splicer		OTDR	RF	Calibration Kit	Fiber Microscope	Power Meter	Cleaver	Stripper
Core	 View7	 View600	 View900 (Cable Antenna Analyzer)	 V96 Cal. Kit	 V20	 V30 Optical Power Meter	 V7/V7+	 TS Plus Thermal Stripper
	 View5	 View500	 View950M (Multi-Scan, 4-port Antenna Tester)	 V95 E-Cal. Kit		 V90, Terminating Power Sensor (RF)	 V8	 DC 300A/B
	 M9							
Clad	 View3	 MINI1/MINI2	 View950K* (Multi-port Antenna Tester, 24-port)			 V91, Directional Power Sensor (RF)	 V9+	
	 View1							
	 M7							
Ribbon	 View12R		 mmWave Spectrum Analyzer*					
	 View4M							

*Roadmap

RF View900 Cable Antenna Analyzer

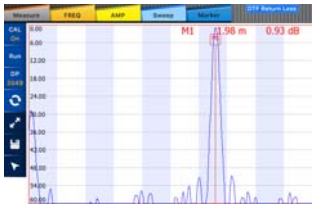
The most reliable & accurate Cable Antenna Analyzer

VSWR

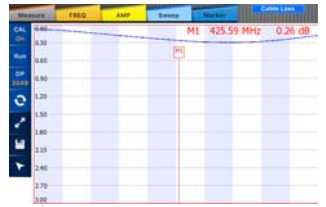


RETURN LOSS

DISTANCE TO FAULT



CABLE LOSS



RF View950M Multi-port Antenna Tester

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Multi-Scan, The most efficient multi port test equipment

- Auto detect for frequency that matches with user-specified VSWR value
- Quick test point search
- Convenient Single Limit setup and edit
- Flexible Configuration to fit to the measurement

View900
Cable Antenna Analyzer

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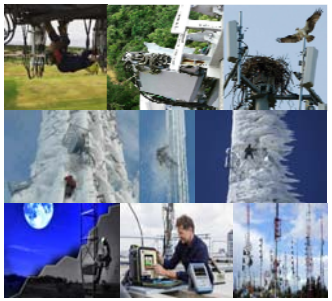
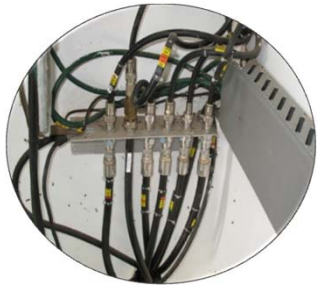
Cell-site Installation



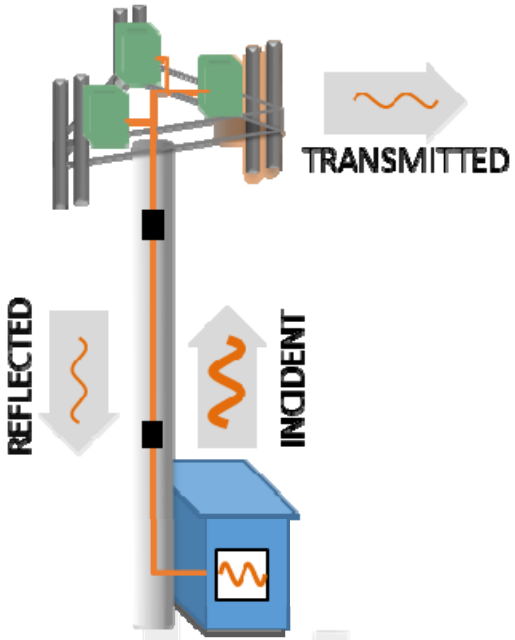


- Why cable installer (contractors) need to test the Cable Antenna System at Installation?
  - Signal reflections on the feed-line reduces cell coverage
  - Over 70% of the problems in cell-sites are related to cable and antenna systems
- Key Measurements to detect and resolve these issues are:
  - Return Loss (VSWR)
  - Cable Loss (Insertion Loss)
  - Distance to Fault (DTF)
- Customer challenges include:
  - Not enough time: need to complete installations as quickly as possible
  - Complexity: need to simplify the job as much as possible
  - Getting the site accepted / closed out: need easy data reporting and management

View900 Cable Antenna Analyzer

Incident, Reflected, Transmitted Wave

Cable antenna analyzer measures the ratio of the reflected signal to the incident signal, transmitted signal to the incident signal to verify transmission line for the maximum power transfer.



REFLECTION = REFLECTED / INCIDENT (1-port Measurement)

- S_{11}, S_{22}
- VSWR
- Return Loss

TRANSMISSION = TRANSMITTED / INCIDENT (2-port Measurement)

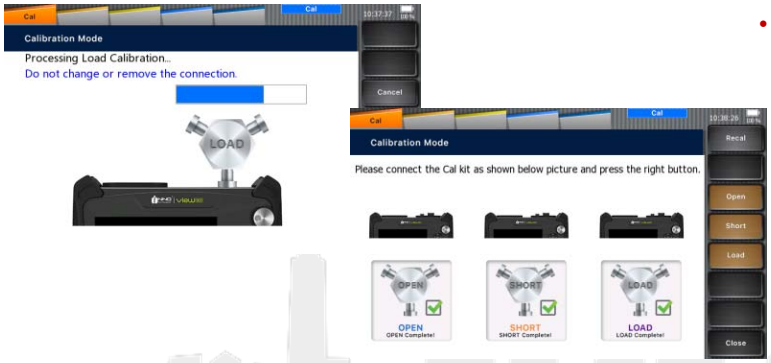
- S_{12}, S_{21}
- Gain
- Loss
- Isolation

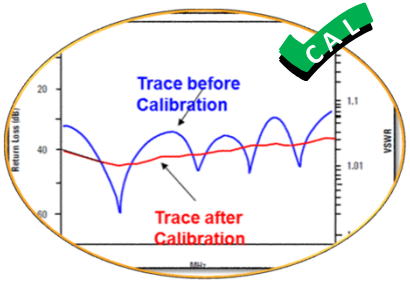
View900 Calibration

Calibration

Calibration must be done before performing each measurement, especially when you change frequency.

- Mechanical Cal.Kit (O-S-L Calibrator)





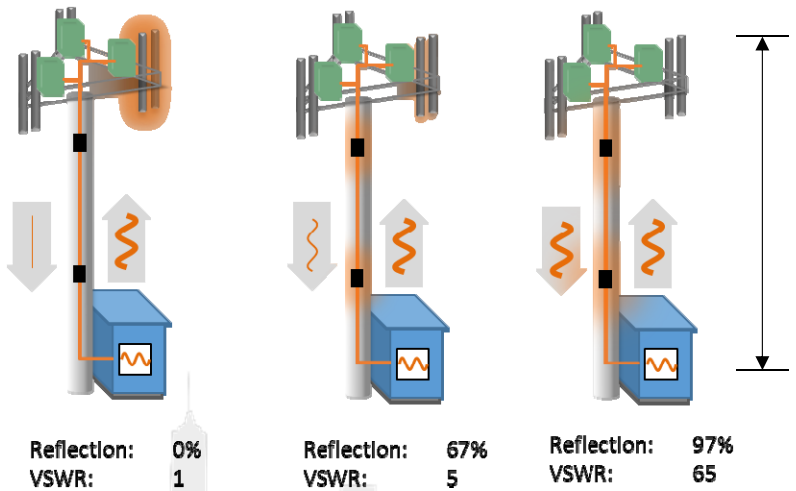
- Frequency changes
- Time-invariant (predictable) systematic errors
- Drift errors changing after calibration
- Temperature changes

- Electrical Cal.Kit (E-Calibrator)

View900 Reflection VSWR/Return Loss

Reflection measures the impedance (50 Ω) performance of the cell-site transmission line across the frequency range of interest in Voltage Standing Wave Ratio (VSWR) or Return Loss.

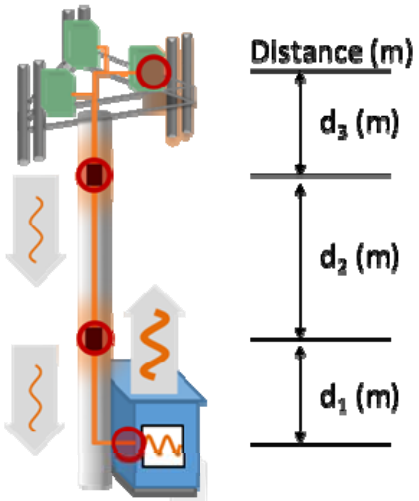
- VSWR is an indicator of reflected signal on the entire feed line. VSWR is defined as the ratio between the maximum and minimum standing waves.
- Return loss is the loss of signal power resulting from the reflection caused by a discontinuity in the transmission line.



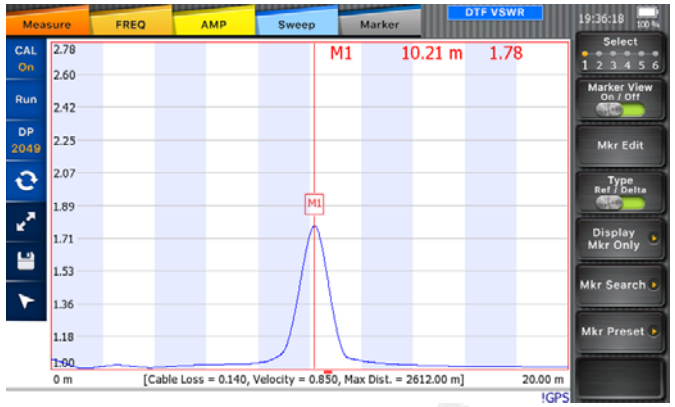
View900 Distance-to-Fault (DTF)

Distance-to-Fault (DTF) is a measurement to identify the fault locations in the antenna line system indicating signal discontinuities in VSWR or Return Loss.

- Most of the antenna line system consists of various types of coaxial cables, connectors, and devices such as dividers and surge arrestors.
- DTF locates the point of highest reflection (loss) and give a distance in the transmission line (Connectors, Joints, Antenna (load))



d_1: xx dB, d_2: yy dB, d_3: zz dB

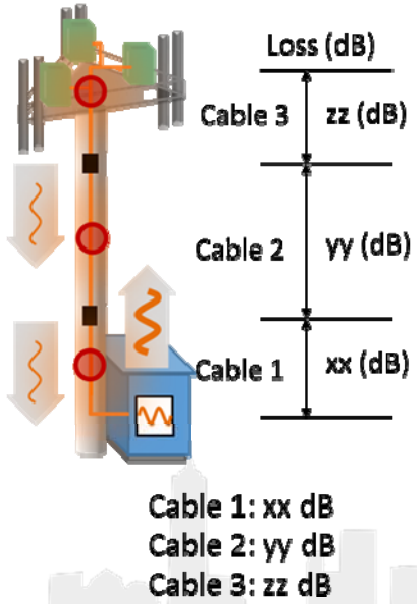


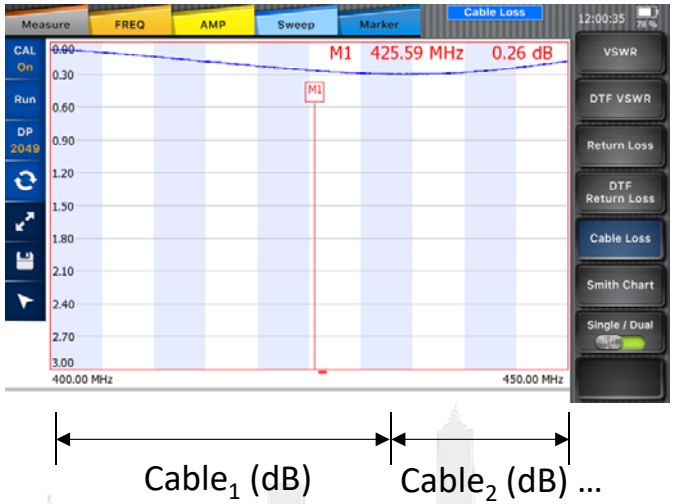
d_1 (m) d_2 (m) …

View900 Cable Loss (1-port)

1 Port Cable Loss measures the signal loss through a cable or other devices over a defined frequency range.

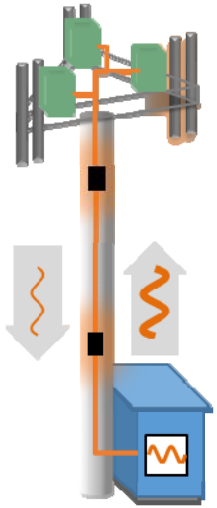
- Cable losses are dependent on the cable type, frequency range, and the length of the cable.
- Insertion loss of a cable varies with frequency (The higher the frequency is, the greater the loss is).

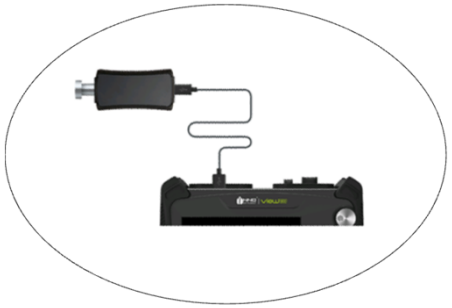




View900 RF Power Measurement

- Power Meter displays the power level in two formats, as a real-time power level value in an analog meter, and as a power level trend through time in a histogram chart.



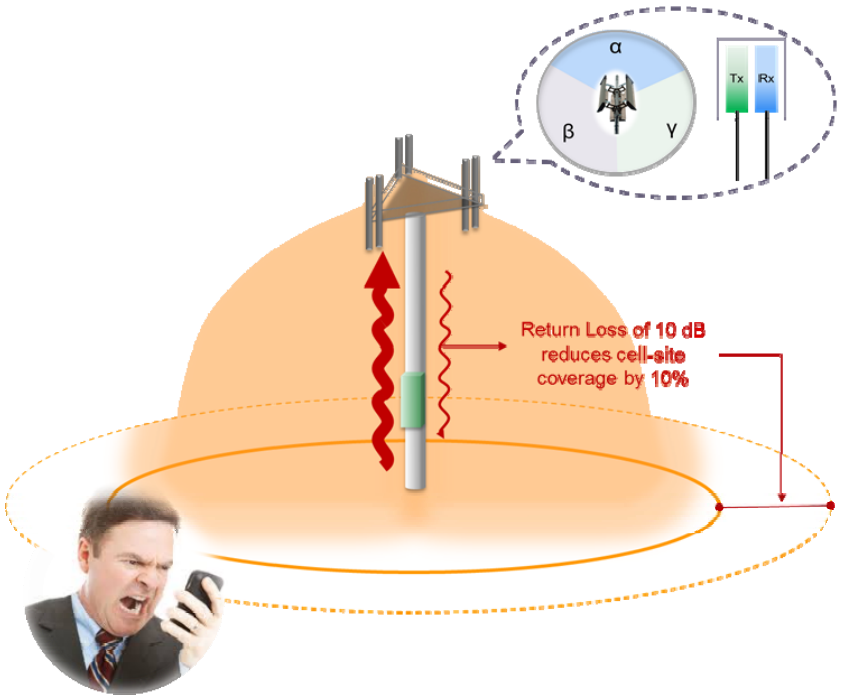


Cable Installer's Pain-points

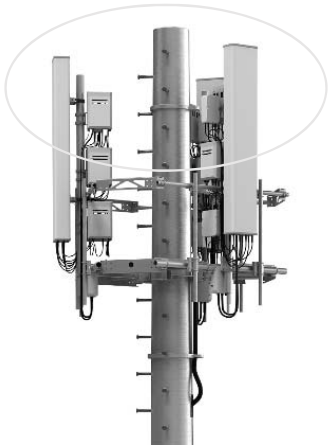
- Impairments in the front-haul cause signal reflections which negatively affect the cell-site coverage:
  - Creates dead-zones
  - Reduces data throughput
  - Increases dropped calls
  - Increases blocked calls

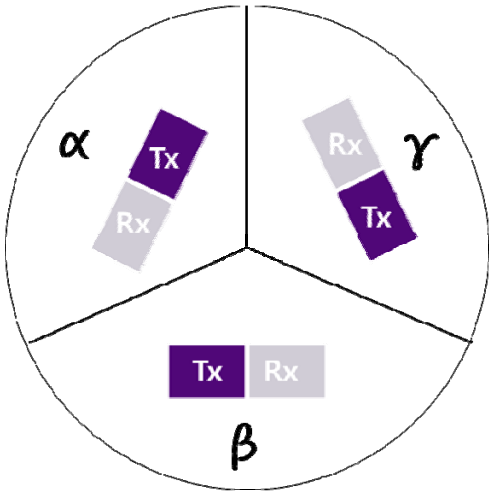
- Need a simple tool to validate transmission line including RF coax and Fiber together

- Faster measurement tool to test all cables in cell site to minimize testing time
  - 3 sectors in a cell site
  - 2 cables in each sector (Tx, Rx)
  - Need to measure VSWR and DTF per each cable
  - MIMO doubled the number of cables
  - At least 6 cables x 2 items = 12 measurements (24 for 2x2 MIMO)



View900 Dual Display

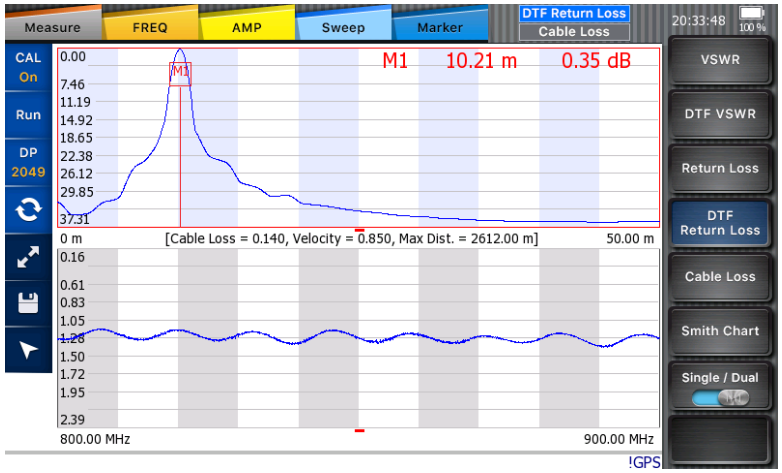




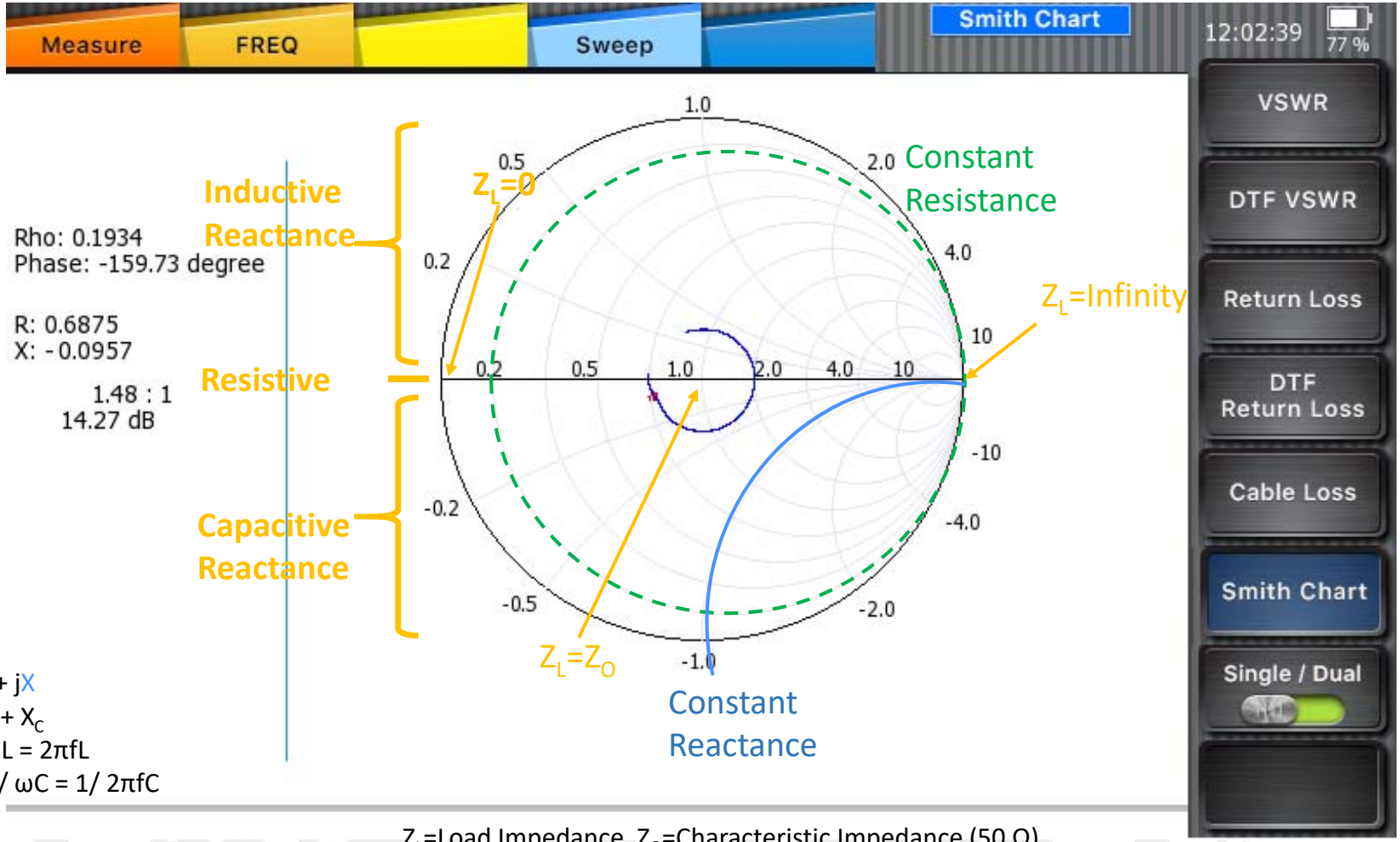
3 sectors
2 cables (Tx, Rx)
2 measurements (VSWR, DTF)

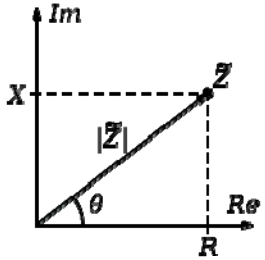
2x2 MIMO = 24 measurements !
4x4, 8x8 ???

Get your work done quickly with dual display



Smith Chart





$Z = R + jX$

$X = X_L + X_C$

$X_L = \omega L = 2\pi fL$

$X_C = 1/\omega C = 1/2\pi fC$

Z_L=Load Impedance, Z_O=Characteristic Impedance (50 Ω)

View900 Configuration

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View900 Ordering Information

Standard Configuration

Version 3.0

Model	Description	Part Number
View900	Cable and Antenna Analyzer View900 include: 1. View900 Cable and Antenna Analyzer, 5 MHz to 6 GHz 2. V96 Mechanical Calibration Kit 3. Soft-carrying Case	TM00900
View900B01	View900 Bundle 1 include; 1. View900, TM00900 2. USB A to USB A cable (1.0 m), TM00900900 3. RF cable DC to 8 GHz Type-N(m) to Type-N(f), 1.5 m, TM00900700	TM00900B01

Supplied accessories: Soft-carrying Case, AC/DC adapter, Rechargeable Li-Ion battery, 8 GB USB memory

Optional Accessories

Model	Description	Part Number
GPS	USB GPS Receiver and Antenna for View900	TM00900GPS
V90	Terminating Power Sensor, Type N(m), DC to 6 GHz, 50 Ω	TM00090
V95	Electrical Calibration Kit, Type N(m), DC to 6 GHz, 50 Ω	TM00095
V96	Mechanical Calibration Kit ,Type N(m), DC to 6 GHz, 50 Ω	TM00096
	Soft-carrying Case for View900	TM00900300
	Backpack carrying case for View900	TM00900301
	View900 Warranty Extension of 1yr for Asia and North America	TM00900100
	View900 Warranty Extension of 1yr for Latin America and EMEA	TM00900101
	View900 Calibraion Services for Asia and North America	TM00900200
	View900 Calibration Services for Latin America and EMEA	TM00900201
	USB A to USB A cable (1.0 m)	TM00900900
	RF Cable DC to 8 GHz Type-N(m) to Type-N(f), 1.5 m	TM00900700
	Rechargeable lithium ion battery	TM00900400
	AC/DC adapter	TM00900500

Thank You!

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