901H

100KHz ... 3GHz KC901H

Handheld Scalar Network Analyzer User's Manual

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Preface

KC901H amateur radio community is our first handheld tracking receiver using a scalar network analyzer. 901H structure Compact, easy to carry, is mainly used for on-site commissioning of various active and passive RF devices, such as diplexers, filters, zoom
, Splitters, combiners, testing VSWR and feeders, including loss. Adding the appropriate external attenuator can be used for debugging
Transmitter, receiver RF circuits. In some cases, also for field strength measurements, interference lookup, cable fault fixed
Position and velocity factor measurements.
Instrument interference ability, dynamic range, completely solved the problem for many years high isolation enthusiasts cavity duplexer tune
Try, strong external interference antenna measurement and other issues. 901H has a wide supply voltage range, can access 1 1. 5-32V
Between the DC power supply, very convenient car charger.
KC901H standing as a radio amateur equipment, or professional communications engineering and technical personnel a powerful help.
This manual describes the network and spectrum analysis on the basis of knowledge, we hope KC901H help you understand the RF test
Method, which will be very useful to improve the DIY experience.
The first chapter, KC901H principles and parameters
Section I, KC901H principle
As shown, KC901H sweep source and the tracking receiver from the two parts. Tracking receiver is divided into two channels, the two
A mixer, respectively, receive the reflected and transmitted signals. IF filter for compression from the spatial harmonics and interference.
TCXO output is divided into two, in order to provide a reference signal phase-locked loop. The output of two phase-locked loop amplification, respectively
In the sweep source output and tracking receiver local oscillator. Two phase-locked loop is synchronized scan, normal mode and its frequency is always difference
An intermediate frequency. This machine is quite 45MHz, IF filter bandwidth is 15KHzo
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Section II, KC901H parameters
Frequency range:
Maximum output level:
Input sensitivity:
Damage level:
Transmission test 100KHz ...... 3GHz (allowed to use. ... 100kHz)
Reflection test 1. 5MHz ...... 3GHz (allowed. ... 1. 5MHz)
+ 10dBm (1 00KHz eleven-lGHz)
+ OdBm (1 - 3GHz)
Better than a 100dBm (50KHz one-lGHz)
Better than 90dBm (1 - 3GHz)
Output port DC15V, +20 dBm
Input port DC15V, +20 dBm
S21 Test Range (typical values):

Resolution:

105dB (1 MHz one-lGHz, is measured at 100KHz dynamic approximately 60dB)

80dB (1 - 3GHz)

Frequency of 1Hz

Level O. 1 block

Uncertainty (typical values):

VSWR bridge toward sex:

Frequency stability:

Power supply voltage:

Guests 3dB (spectrum test, REF two 20dBm time)

Disabilities (0.5 +0.1 L) dB (S21 test, through calibration, including the loss of 60dB L thirty-three time)

15dB (1. 5MHz eleven-10MHz)

25dB (10MHz - 1GHz)

15dB (lGHz eleven-3GHz)

Guests 2ppm/year @ 25 0C

11. 5V ...... 32V (charging)

7.2V (battery)

Battery life (typical values):

3 hours (Spectrum Test)

1 hour (S21 or S11 test)

Dimensions:

230 X 113 X 46mm (length × width × thickness)

Quality (including battery):

Temperature range:

Host Net Weight: about 1. 3kg

Packaging total weight: about 2.0kg

0 ...... 35 0C (normal temperature range)

-10 ...... 45 0C (permissible operating temperature range)

Long-term instruments do not, you should charge at least once a month to prevent battery damage.

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The second chapter, the main significance of Abbreviations

KC901H using the English system, and extensive use of RF test areas common abbreviation. Is commonly used in the condensing of the instrument

Abbreviations to be introduced.

S-parameters are RF network scattering parameters. Sab is the signal from the b port entrance, through the radio network, from a terminal

The mouth of the injection quantity obtained with the magnitude relationship between the amount of incident (on the vector of the phase relationship there).

Sl l, is the signal from the port 1 is incident through the device under test, the the same port (port 1) to the amount of received

Relationship between the amount of the incident, that the signal is reflected back to the device under test's ability to port 1, also known as the return loss in dB. In the absence of

Radio communications, in general, will be converted into the return loss VSWR SWRo SWR two 1.0 means that there is no reflection.

S2 1, is the signal from the port 1 is incident through the device under test, the at port 2 receives the amount of relationship between the amount of the incident,

Also known as the insertion loss or transmission loss (or gain), expressed in dB.

Decibels (dB) is a diagram showing relationship between the number of a way, called logarithmic representation. It is defined as dB two 2010g (V2/V1)

And dB two 1010g (P2/P1). Of the voltage, the change in 6 db per doubling times every 20 db variation; in terms of the power,

Change every 3 db doubles for every 10 db change times.

dBm is dBmW shorthand, is the power unit. OdBm two 1mW, 30dBm 1000mW two 1Wo dBm refers to the larger single

Place in the open test often appear very negative, for example,-90dBm two O.OOOOOOOOlmW two 1pW.

dB 11 dB 11 V is shorthand, is the voltage unit. OdB 11 two 1μV, 60 dB 11 two 100011 V two 1mV, 120dB 11 two 1V.

Instrument uses a 50-ohm characteristic impedance. Known as impedance, so long as we know the voltage, you can use Ohm's law to calculate

The power, and vice versa. Logarithmic notation, this calculation is very simple: OdBm two 107dB11 (Z two 50 Q); dB 11

Two dBm +107 (Z two 50 Q). Remember this important relationship between the number.

MODE is the test mode of the instrument. You can select the test S l1, S21, Spectrum (SPEC), or doing field strength indicator

(FIELD).

C, CENT is at the center of the acronym refers to the center frequency of the instrument, the frequency of the center line of the display.

span refers to the scan width (also known as frequency span), which is equal to the stop frequency minus the start frequency. Distance from the center frequency

Start frequency or stop frequency, exactly equal to half the width of the scan (KC901H frequency using a linear scale). If you set

span two zero, KC901H will only work at the center frequency, then the signal amplitude spectrum will be transformed into the trend.

RBW is the analysis bandwidth, which is approximately equal to the receiver IF filter passband bandwidth.

SWP (sweep) refers to the scan time, it is KC901H from the start frequency to the stop frequency scan once the elapsed time.

step refers to the instrument's step frequency (steps). As KC901H using frequency synthesis technology, based on step as

Walking distance scattered scanned. Step analysis should be much smaller than the bandwidth or the bandwidth of the device under test details, otherwise it will miss skipped frequency

Resulting in inaccurate measurement. But a small step scan takes a long time, so the instrument at the time and did a trade-off between accuracy.

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User settings and instrument displays the value of the step, is the maximum possible. With the span decreases, the instrument will automatically

Chosen as small as possible stepo

If you believe that accuracy more important than speed, you can manually reduce stepo when tested with a larger span some narrowband crystal

Filters (e.g. 300Hz CW communication bandwidth filter), in order not to miss fine structures must be manually reduced stepo

Called the reference level REF. In spectrum mode, it is the instrument shown in Fig bars Flanagan line corresponds to the top-most level value. If

REF two OdBm, it just reaches the top of the peak, the corresponding signal level is OdBm. Generally REF and IF

The gain is chain. REF smaller IF gain greater. When the test signal is weak, you should choose a smaller REF; tests strongly believe

No, you should choose a larger REF. If the REF is small but very strong signal will cause the IF overload. IF gain in auto mode

Type CAuto IF Gain, or simply as AGC), regardless of how much REF, IF gain automatically

based on the signal strength
Adjustment.
The S test mode, the instrument readings as a relative value. REF is the top of the bar chart shows the relative level.
M, mark Cmarker) refers to the cursor. KC901H has two cursors displayed in different colors. Corresponding cursor
Frequency is displayed on the top of the window, the cursor is displayed at the same level (or S-parameters) as well as the value of the two cursors difference CM2-Ml).
In the mark menu, you can select the maximum peak search CMAX peak) and minimum peak search CMIN peak) o C two M, is
Refers to the frequency indicated by the cursor moves to the center of the screen.
Other abbreviation meaning the following table:
Abbreviation Meaning Abbreviation Meaning
power supply switch CAL calibration
FUNC using the calibration function menu ON CAL
SPEC spectrum was not used without any calibration OFFCAL
HOLD stop scanning, keeping lines
BL screen brightness
APO Auto Power Off (Set)
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Chapter III, KC901H (T) of the basic operations
Carpenter power switch (Q WER) the lower left corner of the keyboard. Press once to start, followed by one that is shut down. After boot,
The instrument will default to the last shutdown where the test status.
CENT Juan 0 Japanese 123
SPAN R Dirty F is 56
MAR dizzy FUNC? 8 9
PO CAO ER. ENTER
Figure: KC901H keyboard
| Set Test Mode | First, according to test requirements set test mode. Press the MODE key, you can see the test mode option.
Select the desired mode, the instrument will immediately switch while entering the appropriate mode menu.
Figure: 901H display interface, press the MODE button mode selection menu appears after the test
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Ever need to go back mode menu, you can press the MODE button (followed by once to return to mode selection menu).
| Set the center frequency | Press CENT key to enter the center frequency of the setup menu. The menu lists the common amateur radio frequency
Rates can quickly feet. "Circle", "circle" volumes, each time you press the lift, the center frequency drop eighth screen can be used for fast
Express bit lines.
Figure: CENT amateur frequency shortcut menu with options
You can also use the keyboard to input frequency. Keyboard input frequency, the first type is the MHz digits, after the losers should
Press the decimal point, and continue typing KHz Hz digits. You can always press the ENTER key to confirm the input frequency, input less than the median
The instrument will later fill in zero. Dial can be used to fine-tune the center frequency tuning step 1EE SPAN linkage with the SPAN small
At 100MHz, each step corresponds to approximately one percent screen.
Figure: the cursor position is activated

| Set the frequency span | Press the SPAN key and enter the span setting menu. Span can quickly select, you can also use the keyboard to enter.

Dial for fine-tuning the frequency span, the adjustment of step with SPAN linkage, SPAN bigger step higher. Frequency and frequency span are

After setup is complete, t Green wait a few seconds, the instrument will be loaded into the system calibration parameters.

| Set the reference level | Press REF button to enter the reference level setup menu. Different test modes a reference level different meaning

The. In spectrum mode, t Green estimated the size of the signal under test, the reference level is set to slightly larger than the measured signal.

Cum two side if there is a strong signal nearby, place the reference level is set to +20 dBm, in order to avoid damage to the intermediate circuit.

In S21 TEST mode, the measured value is relative, but the instrument is still used to refer to REF, recommended setting is +10 dB, measured

Trials adjusted according to the situation. REF can use the trackwheel or menu "+", "one" function to set the stepper is 10dB. In

S21 mode, AGC function is automatically turned on, the IF gain REF chain is released, then the line went to show the range of possible

In addition, to be observed in detail by adjusting REF.

In S l1 test mode has two display modes: logarithmic display (10g, keys marked 10ss) and linear display (l in,

Button marked SWR). Logarithmic display mode REF proposal to +10 dB; linear fashion REF should be 1.0, but this time curve

May exceed the display range can be adjusted at any time during the test.

Cum i1f1 Kω1H can output more than 10 anti-prolyl external antenna should be to prevent harmful interference to radio services.

| Use the cursor | Press MARK key to enter the Cursor menu. Choose soft menu MAX PEAK, the cursor will look within the display range

The maximum spectral lines (generally used in the spectrum mode); choose MIN PEAK, you can find the minimum (or S21 model in S l1

Style used). Can be adjusted with a dial position of the cursor. Choose soft menu M 1/M2 or lift press the trackwheel, you can switch is activated Jie

Cursor. To move the cursor to the line at the center of the screen, a green Option C two M (center two marker).

Regret for scanning | the cursor menu (see "Using Cursor"), there is an option to back technology key once, the instrument will be suspended

Scanning the spectrum does not change remain displayed. Followed by a national team of the instrument resume scanning. LD spectra displayed when returning

Not stored, the instrument off then disappears. In the HOLD status change measurement parameters, the instrument will exit the HOLD state.

| Access spectrum I 901H can store four spectra. Press the FUNC button until the System Menu. Select SAVE function

Able to enter the store menu. Select the desired save location (one of four spectra), key once, that will be stored in the corresponding bit in the

Position. If the location already exists spectra, new write operation will clear the original data. Read spectra similar to the operation,

Should enter the FUNC menu, select READ function, select the location to be read. Spectrum is saved with parameters, when exiting read

Spectral function, the instrument will continue consistent with the spectrum parameter settings.

| Enable field strength testing | field test has a higher response rate, applicable to find the source of interference and other applications. Enter MODE

Menu, select FIELD, you can enter the field tests. Strong presence test mode, AGC has been open automatically, no need to set
REF.

| System Settings I FUNC is the system setup menu. In which you can set the frequency step (step), stored (SAVE)
And read (READ), set the system time (TIME) and automatic shutdown time (APO), set the screen brightness (BL).
FUNC menu is limited under the CAL manufacturers and authorized service personnel.
| Set up automatic shutdown | Press FUNC key to select the TIME menu, and then select APO menu. If the leftmost menu
APO ON, indicates not enabled automatic shutdown, press the ON button to start. If the display time, the automatic shutdown function has been
After startup, press APO OFF key, you can turn off the feature. "+", "" Option is used to adjust the time. Select the range of 3 ...
30 minutes.
| Port of use I 901H has two external RF ports. A sweep signal source which is the output port, the other is
Tracking receiver input port. There is another department within the instrument tracking receiver, its port has been connected directly to the bridge
The reverse detection side. Port layout shown below.
= Three / ~
Figure: Port Layout

Chapter IV, test preparation
RF circuit and the low frequency circuits of the test were significantly different. In the test frequency circuits, we can use a multimeter to measure any
Meaning between two points of voltage, resistance, can be arbitrary test circuit with a few copper wire connections .... When the frequency is increased to an
Extent, the traditional testing methods are either low frequency will seriously affect the operation of the circuit, or would result in any unacceptable error, even
To the test results with the opposite is true. The wrong test method will lead us astray, thus seriously affecting the DIY into
Power. Came to the RF world, we must be prepared to specialized equipment, using the correct methods in order to obtain reliable results.
1J}, 811 in addition to the device under test being beyond the reach inside our outside, should make the entire test system impedance matching.
KC901H nominal impedance is 50Q. In the test system, including access member, coaxial cable, external attenuators, filters,
Until the DUT port impedance should all 50Q. If your system has some irreplaceable device is not 50Q impedance
On the need for matching, so that their port transformed to 50Q. Otherwise, these devices will cause a large standing waves, generating unpredictable
Material loss, resulting in test results can not truly reflect the characteristics of the device under test.
Try not to use a damaged cable, you must use the appropriate parts including coaxial connection to connect coaxial cable. Do not try to use copper
Wire, self-esteem items like fish clip to connect the test system was not to pass are welded core wire and the shield of the coaxial approach to be disconnected
Cabled together eleven unless you are at war, the enemy had requested reinforcements flew in front of the signal sent ...... yet.
These methods not only connected impedance deviates so far, but also acts as an antenna.

Figure: Wrong connection method
Figure: Correct the connection method
Including various coaxial connection piece has its applicable frequency range, including pieces of different quality can be used to pick the highest frequency is different o
KC901H configuration includes an N-type seat, enclosed head with matching buy if you spend 10 dollars, so generally used up to 5GHz,

For our testing has been sufficient. M-type connection or SL16 enclosed items in the premise of good quality, and can only work to
500MHz or so, we should try to avoid using. Q9 superior quality BNC or type connection member may apply to 2GHz, including even
High, in most cases, can be used.
Sometimes you need to test the PCB circuit, this time to try to avoid the impact of the circuit to be measured. If the impedance of the circuit under test
Very low, it touches you can try directly tested. Otherwise, it should be using a special high-impedance probe.
For I, it often does not require impedance must match, but more concerned about the test results on the problem to be solved in terms of
Does it make sense, it requires experience.
11f 15-1 KC901H port allows withstand 15V DC voltage, once exceeded, the instrument will be quickly damaged.
1J}, 821 using a variety of possible ways to calibrate the test system.
KC901H already at the factory on the own port calibration, in most cases, can be used directly. Another
Regard, the device under test can not be directly connected to the instrument ports must pass a certain length of cables and include a sufficient number of access
Parts, cables, and then will be introduced, including parts or bring VSWR Insertion Loss.
Another variation with temperature and time, instrument
The performance will be changed within a certain range. If these adverse conditions of the interferences on the test, it should be calibrated.
Before calibration recommended preheat for 1 minute.
S21 calibration before the test
If the device under test light and small, which allows the device under test is connected directly to a port on the instrument (although this is not a good
Habit). In this case, only need to increase the RF cable can be composed of a test system. If the device under test is relatively large or
Then the model, including pieces do not match exactly, you need to use two RF cable.
Figure A: use a cable connection test calibration
For the case of a cable, before the start of the test, these cables should be connected directly across the two ports of the instrument
On (on the map, and perform software calibration. If you use two cables, use a good quality pieces will then include them
Connected together, and then across the instrument's two ports (figure below the elbow, perform software calibration.

Straight joints
Figure B: with two of the cable connected together at their calibration
Software calibration steps are as follows:
(1) into S21 model, appeared Please CAL prompt → (2) Connect the cable → (3) Select CAL, press mention
Display operation (followed by the FUNC start calibration) → (4) patience (may require a ...... 5 seconds) Show CALED that school

Quasi-complete.

If you have more than one system in series cables in different places, they can be connected in series together for a full calibration.

Test the amplifier should be in series with the amplifier output port of the attenuator. If the amplifier gain is greater or apply

Small signals, it should also be in series with the input attenuator. Before doing this test, you can put all the attenuator and cable series

Linked together to perform the calibration operation. If the amplifier gain is greater than 20dB, you should calibrate after access attenuator.

User calibration parameters are not saved. Changing the frequency or reboot the device, it will automatically call the factory calibration parameters. If you want to

Clear calibration parameters, need only slight change SPAN or CENT, will be replaced with the factory calibration values. OFFCAL Options

Refers to any calibration (including factory calibration) do not use.

111 Æîl each calibration frequencies only on the current settings and accessories used to be amended. Once the test frequencies are changed or replaced

The test cables, shall be re-calibrated.

S11 is calibrated before testing

S 11 function has two display modes. Logarithmic mode displays the return loss (dB value), the cursor (maker) shows the logarithmic

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Return loss. Linear mode displays voltage reflection coefficient and the cursor reads SWR (SWR) o KC901H designed test

Into account the difficulty of post-calibration, if you are concerned about the return loss of 10dB or less, or the reflection coefficient greater than 0.2, it allows

Eliminating the need for pre-test calibration. If you exceed the above range, or by a long cable to connect the device under test, it should be calibrated.

Logarithmic mode allows calibration without using any (OFF CAL), linear mode does not allow closed calibration.

Process is: the instrument under test requirements set other parameters, then the output port open (unconnected). Press MODE, choose

Optional Sl l, enter S 11 mode menu, select CAL. Whether the instrument prompts to connect the load or open, short circuit device, all root

According to proceed to the next prompt, press the FUNC key until the calibration is complete. Prohibit using simple linear model calibration.

The various parameters, and then S 11 menu, select CAL. The instrument prompts to connect standard load (Load), please output

Port installation 50Q dummy load, then press the FUNC key to calibrate. After prompted to connect open device (üpen), then after a good

Followed by FUNC key. Be prompted to connect the instrument shunt (Short), this time connected to the short circuit, press FUNC execution. All school

Quasi-complete, the instrument displays CALED. In order to ensure the complete set of calibration data, the calibration process is not allowed to quit, unless

Re switch.

Standard calibration load, open circuit, short circuit should reach a certain quality, such as load return loss should be less than 40dB,

Open circuit, short circuit device of the standing wave (SWR) should be greater than 50. In the case of frequencies below 500MHz, open circuit can be deprived

The enclosed needle instead of a new connection, including parts, the instrument can also be left unconnected output port. Can be made short, that will take some way connected

The needle member including the housing, including a short circuit, such as the back filling the tin. The load can be selected commodities power dummy load (this is love

Good of essential equipment). Note that more than ten million common domestic small power loads are mostly inferior products, unfit for use.

Even if the other end of the cable were calibrated by a long cable to test a device (such as an antenna) of S 11

Is not recommended. When the standing wave was relatively small, this will increase the error. States should identify the vector orbital combined experience. S 11 tests should observe the return loss trends, concerns the slow emergence of the small

Value and the minimum value exists in isolation. Do not go for a sharp minimum, in particular, should be alert to appear cyclical trough. Because these special

Special point is probably because the phase of the echo phase leaky waves generated just difference 1800.

Chapter V Common test methods

First diplexer quick adjustment

Duplexer is an important component of the relay station, its insertion loss and isolation is directly related to overall performance of the relay station.

KC901H in common VHF / UHF bands can provide superior operating range of 100dB, it can be monitored by the duplexer tune

To the optimum state.

Need to prepare Accessories: 50 Q dummy load one, two RF cable (shielded necessarily better, connected at both ends to enclose parts

Reliable), the RF connection, including the necessary components. The KC901H fixed on the table.

Scalar network analyzer KC90 1H user manual executioner Novosti 2012 edition - 13 - Debugging tools: with a central through-hole socket wrench, screwdriver. If possible, it will maintain a fixed adjustment duplexer

On the work bench.

Here to the six principles notch filter cavity duplexer, for example, describes how to debug procedures.

The KC901H set to the S21 mode, set the instrument center and span, covering the band's original frequency diplexer

The new frequency. REF can be set to OdB or +10 dB, step is set to lMHz. The markl and mark2 were moved to the double

KOHKI new receiver frequency near the frequency of the transmitter.

Figure: Testing the connection method example diplexer

i Green first with instrument testing RF cable insertion loss (S21), and gently shake the test cables and connectors, confirm

No bad situation. The cable insertion loss should be as small as possible, if more than 3dB or instability may cable is faulty.

Cable quality is good enough to provide good shielding.

Please include seat cleaning diplexer clean the KC901H output port to the TX port of the diplexer (generally

Note the high), the instrument input port to port ANT diplexer, the remaining RX ports (generally

Marked low) connected on a dummy load. (Pictured above)

Adjusting the three screws near the TX port, so that the trough moves to markl indicated position, and try to coincide. In markl

S-readings were monitored by fine tuning screw, so that reading the smallest (the most negative). Under normal circumstances, should reach the above-60dB.

The KC901H change is connected to the output port of the diplexer RX ports, input port is still connected to the ANT port, TX side

I received the dummy load. Adjust the side near the three screws RX ports, so that the trough moves to mark2 position and try to smooth coincide.

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Then mark2 S-readings monitored from the center to fine-tune the RX side repeated three screws, so that the minimum reading mark2. Positive
Under normal circumstances, should reach a 70dB.
Again set the instrument CENT, REF, reducing span, so that the new enlarged frequency curve and above the background noise. More
Accurate adjustment makerl, 2 position, and then thru S21.
The output of the instrument re-port to the TX port diplexer, dummy load grafting RX port. Sequentially from the middle to the TX side
Repeated trimming three screws that markl minimum readings. Under normal circumstances should be better than-90dB. At this point read mark2 S-parameters,
Is the transmitted signal diplexer including damage.
Figure: HIGH side diplexer typical curve
The instrument's output ports grafting RX side, dummy load grafting TX terminal, trimming RX side three screws that mark2 reading
Minimum, under normal circumstances should be less than-90dB. Read markl S parameters is duplexer including loss of the received signal.
Some parameters affect each other on both sides of the duplexer, you may need to adjust repeatedly until the suppression index reaches 90dB or more. After
Over repeated adjustments, if inhibition index does not reach -90 clumsy, including damage or not less than 3dB, the diplexer may be a problem, but also
May not be suitable enthusiasts.
State diplexer design for the "broadband" use, that allows lMHz change the range of about frequency of use, stopband song
Line should be adjusted stepwise, its rejection is often only about 50dB. For lovers, this is not applicable diplexer
The.
When including the loss and suppress contradictory, they should give priority to ensuring RX side suppression. Appropriate to reduce the repeater station transmit power from
For thick degree adjustable via screw duplexer, you can adjust the fused screws. Various adjustment screw if not long enough,
You can change the growth screws. If the screws need to enter is long, the Q value decreases diplexer isolation is deteriorated. In such situation
I am afraid the situation changed only open solenoid a diplexer.
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Including loss of less than 2dB, do not have the test diplexer SWR. If the transfer does not include loss of down, consider S 11 test (non-
Dummy load connected to the test port, should not be connected to the instrument input port), and the tentative regulation, and other indicators to make trade-offs, as far as possible
SWR control to two or less.
Please choose in the adjustment process fasten the nut, so that parameters fixed.
If you are a first adjustment diplexers, in order to prevent mistakes, connect dummy load connected to the ANT port, and then KC901H
Input and output respectively connected to the duplexer TX, RX port, the mark is set to the vicinity of the relay station transmit frequency. At this time,
S RX side readings should reach the value of isolation, in principle, less than 70dB. This test is to ensure that no wrong tune the last one anti-
Line. Error debugging may cause relay station burned.
Second test antenna and feeder
1, the antenna VSWR test
Test antenna should set the instrument in the S 11 mode, select Show VSWR (LIN, SWR) or Return Loss (LOG,

10ss). Setting the center and span, testers away from the antenna.

Antenna VSWR subject to site environment. Should choose open outdoor environments, such as roof top. To eliminate the feeder

Impact, if necessary, the antenna may be connected to one end of the feeder is disconnected, including feeder calibration, see "preparation before the test."

When the feeder length is less than the test frequency wavelength eighth most high-end, or just debug observation, you can not calibrate.

State feeder and the total electrical length of the antenna should avoid fourth test frequency an integer multiple of the wavelength. If you can not avoid,

To {called "resonance" with sufficient vigilance. If such a "resonance point" appear periodically on either side must be serious doubts

Its true and false.

In engineering we tend to want to know the size of the antenna VSWR when used, that is manifested on the transmitter port VSWR size.

This situation can be directly measured on the feeder port. If you want to know through the feeder antenna return loss and not any

Conditional on the other end of the feeder calibrated to test 1 Blue cable loss, and in the feeder and the measured return loss of the antenna as a whole

After consumption, minus twice the feeder loss.

State KC901H is constant scalar parameter tester, in theory, can not be eliminated because of the trend vector synthesis aggravated sexual orbital.

When the measured return loss is close to or less than the bridge toward sex (indicator has been given in the first chapter), the number of modes should not make

With a linear mode automatically according to certain mathematical methods proposed the approximate curve with the reference value, but not as a quantitative

Basis.

2, single-port test method feeder loss

Sometimes feeder has been installed in place, we can not put the two ports simultaneously connected feeders do 901H S21 test. This kind

Circumstances can use two KC901H ends were connected to the feeder-by-point test. In only one 901H, a rough test

Feeder loss is still feasible. Specific methods are as follows:

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Set the instrument in the S l1 mode, the selected frequency parameters, the display mode is set to return loss (loss, dB display),

The output port for easy calibration. The instrument is connected to the feeder, the feeder the other end unconnected, each measuring short time, the test

Use the cursor readout test frequency points (to avoid the spikes) return loss and recorded. Linear average of two readings or about

Feeder loss is equal to twice. The following conditions for the 500MHz, may be performed only open test. Before using this method should estimate

Feeder loss, preferably less than one quarter of the bridge towards.

3, the test speed factor of the coaxial cable

Coaxial cable velocity factor (sometimes referred to as the reduction factor) is an important indicator of the coaxial cable, balancer in the production of

Axis omnidirectional antenna and other works when they need to use. Speed factor mainly between the inner conductor of the cable dielectric permittivity decision

Fixed, while the dielectric constant of the test is too much trouble (see "Simple coaxial production >> omnidirectional antenna, radio, 2004's. Enable

With the 901H can easily measure the speed factor.

Figure: Job typical method of electrical length

In S l1 logarithmic mode, set the frequency of 1GHz or higher, span is set to 500MHz. Take as

long coaxial

Cable (preferably more than 10 meters), one end mounted N (J) type connection includes pieces to make a direct connection to the 901H, neatly cut and the other end

Remain open. Displayed on the viewing screen wavy curve adjustment span, so that clearly show two or more wave cycle; such as

If the wave is not obvious, can change the center frequency (CENT), choose the most obvious frequency to be tested. Use the cursor to read two consecutive

A wave (peak) of the total length, and pay attention to select a sharp cyclical characteristics (likely at the top, may also be at the bottom,

Shown at the bottom of the case) as the measuring point. Note the cursor wavelength difference $A\lambda$ (dL), is the electrical length of the coaxial cable.

Measure the total length of the coaxial cable, the electrical length divided, that the velocity factor.

In order to reduce reading errors, reduce the span, the amount of the full length of the entire screen. If you take the figure below 50MHz span two

Will be more accurate.

Using the above method, in turn, can be used 901H measure the length of the coaxial cable (the terminal can be shorted). This looks

Little practical value actually measured is important, because if the amount to far less than the length of the actual cable length,

We can conclude that the cable is faulty, the length measured precisely with your electrical fault distance. This is the common method of fault location.

To do with the 901H fault location, the terminal should be connected to a matched load.

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4, external directional bridge extended test range

Subject to size limitations, 901H built bridge towards is limited, when you need to test a large return loss, you can add a

Have a higher bridge toward sexual. Connect to the input of the bridge output port connected to the instrument; inverted output terminal connected to the instrument

The input port. Use S21 model, the output of the bridge open for S21 calibration.

Section spectrum display

KC901H on the input channel to enhance performance, it can provide a simple spectrum display. Iff ~ I Chuan is a network analyzer, spectrum function is not an official function, the test results for reference only.