HUBER+SUHNER TEST KIT MCX–MMCX

(Deutsche Version siehe Punkt 1)

6 Description of the Test Kit

Up to now, it has been necessary to apply adaptors in the calibration of test set-ups using MCX interfaces which are not provided for by PC3.5 Cal-Kits. The MCX Test Kit now allows the direct determination of the phase and amplitude of all S parameters of a test set-up.

In practice, the calibration most frequently selected is the standard OSL calibration. It requires 3 standards for the 1-port calibration: one open, one short and one 50 Ohm load. There are many other calibration processes besides this one. HUBER+SUHNER has selected an offset-short calibration technique with 3 standards, one Short, one short with known phase or length, and one 50 Ohm load (abbreviated: SSL).

The Test Kits have been designed for a frequency range of up to 3.5 GHz. The electrical length of the "short" or "offset short" relevant to the calibration (in millimetres) is printed directly onto the individual components (blue sign). This makes it possible to exchange a component when the new electrical length is taken into account.

No certification by any national standards office exists. The individual components therefore do not require any factory recalibration. We stress the fact that the Test Kits developed should not be applied as calibration kits if they are not validated. But users may apply the Test Kits as they see fit as reference standards for their applications. This is adequate for most applications.

7 Contents of the Test Kit

The Test Kits consist of one short, one offset-short and one wideband load each for positive and negative interfaces. The set holds space for four optional positive and negative adaptors each for the MCX and MMCX series. The contents of the Test Kit are specified on the inside of the lid behind the swing-up foamed plastic.

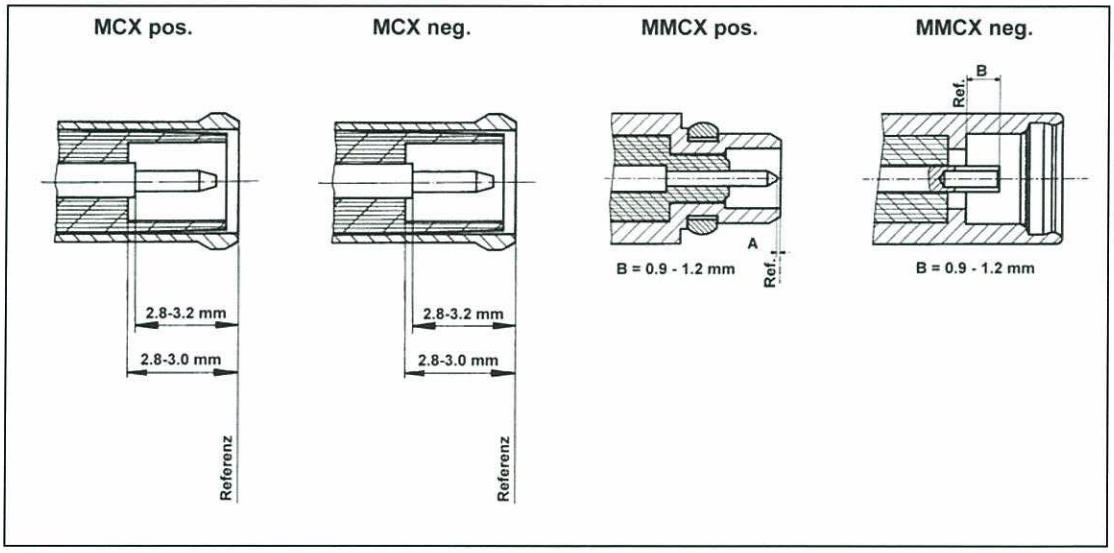
8 Precautions

HUBER+SUHNER Test Kits are precision components that must be treated with due care. The following measures must be observed to maximize the service life and to ensure trouble-free operation. Non-observance of the mentioned points will lead to measurement inaccuracies or to the destruction of the Test Kits and test components.

8.1 Connection dimensions

The connection dimensions of the Devices Under Test (DUTs) which are mated with the test components must be checked each time before mating.

If a DUT with unallowable connection dimensions (relative to the reference plane) is connected to the test components, this may damage the components. It may result in wrong measurement results, the destruction of the test components, or the damaging of the DUTs subsequently verified.



8.2 Tightening torque of nuts

Excessive tightening may damage the test components. Always use an appropriate torque spanner. For series SMA and PC3.5 connectors, observe a torque of 0.4 to 0.6 Nm for measurement purposes.

8.3 Mechanical shock

The test components must never be exposed to shocks such as are caused, for example, by falling down. Such loads may change the connection dimensions or important electrical characteristics, or may result in immediate destruction.

8.4 Cleanliness

The test components must be kept clean. When not in use, shut off the interface with the protective cap. Remove any deposits using a small and soft wooden rod.

8.5 Incompatibility between MCX 75 Ohm and MCX 50 Ohm

The components of the MCX 50 Ohm Test Kit must not be coupled with MCX 75 Ohm components. In case of accidental coupling, mechanical damage is likely.

9 Test procedure for Anritsu and Agilent network analyzers

To allow a vectorial network analyzer to perform an error correction, the applied standards must be exactly defined before calibration. Enter the definition and the parameters of the different standards in the memory of the network analyzer. This input is supported by the menu guidance feature of the network analyzer. Depending on the specific type of network analyzer, menu guidance and parameter input may vary. Each Test Kit has individual short and offset-short lengths. The electrical length of the "short" or "offset short" relevant to the calibration (in millimetres) is printed directly onto the individual components (blue sign).

10 Test procedure with Anritsu network analyzer, Model 360 B

- In the calibration menu, select the [OFFSET-SHORT] calibration.
- Depending on your specific measurement task, select a 1-port or 2-port calibration and the desired frequency range (maximum: 3.5 GHz).
- Enter the short length and the offset-short length. You will find the relevant length specifications on the test components (blue sign). The lengths correspond to the electrical offsets expressed in [mm].
- Start the calibration.
- Connect the relevant components in the correct sequence, as specified by the menu guidance system.
- Press [Enter] to transfer the calibration, or save the calibration.

Additional information is provided in the user manual of the NWA in the section on offset-short calibration.

11 Test procedure with Agilent network analyzer, Model HP8720D

- In the calibration menu, select Modify [USER KIT] to enter a user-defined Test Kit.
- Press [DEFINE STANDARD] to define the standards (open, short, match, through) that you needfor a calibration. You must define the same number of standards as error terms that are to be calculated. For a 1-port calibration 3 standards, for a 2-port calibration 10 standards (without isolation).
- Allocate a reference number to the defined standards.
- Enter the standard parameters, the electrical delay, the frequency range, the impedance, etc. (see example for a 12-term calibration). The electrical offset delay in seconds is calculated on the basis of the length specified on the test components (blue sign) divided by the speed of light in air (delay= l/c; c=3 E08 m/s). If you enter a finite frequency range for the standards (here up to 3.5 GHz), a calibration across this range is, of course, no longer possible.
- Now go to [SPECIFY CLASS]. Here, the defined standards are allocated to the error terms of the error model.

- With [LABEL CLASS] and [LABEL KIT], you can assign names to the standards and the Test Kit.
- Finish by actuating [KIT DONE] and [SAVE USER KIT] in order to save the parameters drawn from the Test Kit.
- Depending on the specific measurement task to be performed, then perform a 1-port or 2-port calibration by following the prompts of the menu guidance system.

12 Use of saved calibration data

To avoid having to enter the parameters of the individual component from scratch each time a calibration is performed, the data obtained in a calibration can be saved on a diskette and be used for a new calibration. Note that after reading in the ‚old` data, you must perform a new calibration (depending on the requirement, 1 Port, Full 2 Port, etc.).

The information stored in the cal set of the network analyser or on the floppy disk should match exactly the information written down on the units. Caution: The H+S delivered offset information is in mm (SI) – please convert if inch is required.

13 Performance features

The accuracy of a measurement is on the one hand dependent on the specifications of the Test Kit components, but on the other hand also on the reliability of the connection and on the environmental conditions. One of the most important characteristics during a measurement is the return loss of the terminations and of the DUT. In order to obtain an acceptable measurement precision, the return loss of the terminations must be significantly better than the return loss of the DUT (minimum 8 dB).

In phase measurements, the precision of the electrical length is crucial. The electrical length stated on the components (short, offset short) has been measured to an accuracy of +/- 0.14_ (up to max. 3.5 GHz). With this tolerance, the influence of the short length on the measurement uncertainty of a set-up will not exceed +/- 0.28_ (up to 3.5 GHz).

FREQUENCY RANGE	MMCX	MCX
DC – 1 GHz	36 dB	38 dB
1 – 2 GHz	35 dB	36 dB
2 – 3.5 GHz	32 dB	32 dB

Max. RF-input-power of the loads: 1 W (cw)

Operation temperature: + 10°C to + 30°C/+ 50°F to + 86°F

Range of application of the Test Kits: DC - 3.5 GHz

HUBER+SUHNER

HUBER+SUHNER AG
Radio Frequency Division
9100 Herisau, Switzerland
Tel. +41 (0)71 353 51 11
Fax +41 (0)71 353 45 90

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