

## RF CURRENT MONITORING PROBE

### 1 Introduction

The TBCP4-500 is a fixed aperture RF current monitoring probe, expanding the Tekbox product range of affordable EMC pre-compliance test equipment.

The probe has a flat response with a 3dB bandwidth of 500 MHz and is characterized and usable over the frequency range from 1kHz to 600 MHz.



*Picture 1: TBCP4-500 RF current monitoring probe*

The aperture of the RF current monitoring probe is 32 mm. Its transfer impedance is 16 dB Ohm in the flat region, with a 3 dB bandwidth from 400 kHz to 500 MHz.

## RF CURRENT MONITORING PROBE

### 2 Specification

Characterized frequency range: 1 kHz to 600 MHz

Aperture diameter: 32 mm

Outside diameter: 73 mm

Height: 20 mm

Weight: 320 g

Connector type: N female

Transfer impedance: 16 dBΩ in the flat region, typ.

3 dB bandwidth: 400 kHz – 500 MHz, typ.

Max. primary current (RF): 3 A

Max. core temperature: 125 °C



### 3 Transfer impedance

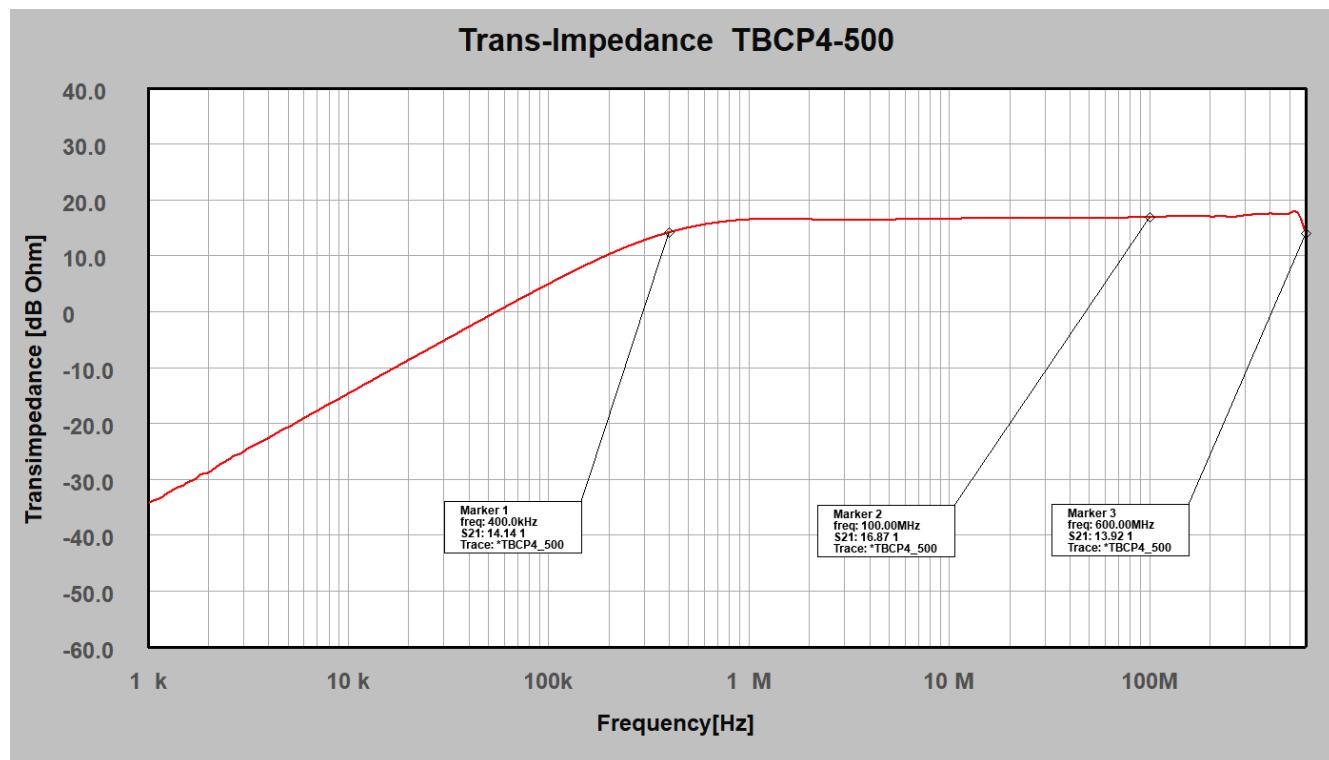


Figure 1: typical transfer impedance: 1 kHz to 600 MHz

## RF CURRENT MONITORING PROBE

### 4 Typical transfer impedance table

The table below shows typical transfer impedance data of a TBCP4-500 current probe. Each current probe is delivered with its corresponding measurement protocol. This data can be used for the creation of a correction file for EMCview or similar EMC measurement software. The transfer impedance in  $\text{dB}\Omega$  subtracted from the analyzer reading in  $\text{dB}\mu\text{V}$  gives the corrected reading in  $\text{dB}\mu\text{A}$ .

Refer to the application notes of EMCview on how to create a current probe correction file.

| Frequency [MHz] | Transfer impedance [dBΩ] | Frequency [MHz] | Transfer impedance [dBΩ] |
|-----------------|--------------------------|-----------------|--------------------------|
| 0.001           | -34,33                   | 100             | 16,87                    |
| 0.0025          | -26,64                   | 125             | 16,98                    |
| 0.005           | -20,75                   | 150             | 17,09                    |
| 0.0075          | -17,16                   | 175             | 17,10                    |
| 0.01            | -14,70                   | 200             | 16,96                    |
| 0.0125          | -12,80                   | 225             | 16,98                    |
| 0.015           | -11,20                   | 250             | 16,95                    |
| 0.0175          | -9,87                    | 275             | 16,98                    |
| 0.02            | -8,72                    | 300             | 17,22                    |
| 0.025           | -6,82                    | 325             | 17,31                    |
| 0.05            | -0,88                    | 350             | 17,46                    |
| 0.075           | 2,53                     | 375             | 17,41                    |
| 0.1             | 4,90                     | 400             | 17,50                    |
| 0.125           | 6,70                     | 425             | 17,33                    |
| 0.15            | 9,23                     | 450             | 17,41                    |
| 0.175           | 10,19                    | 475             | 17,41                    |
| 0.2             | 12,73                    | 500             | 17,52                    |
| 0.25            | 14,14                    | 510             | 17,70                    |
| 0.5             | 15,01                    | 520             | 17,86                    |
| 0.75            | 16,06                    | 530             | 17,90                    |
| 1               | 16,45                    | 540             | 17,77                    |
| 2.5             | 16,42                    | 550             | 17,47                    |
| 5               | 16,44                    | 560             | 17,01                    |
| 7.5             | 16,51                    | 570             | 16,39                    |
| 10              | 16,59                    | 580             | 15,64                    |
| 25              | 16,73                    | 590             | 14,80                    |
| 50              | 16,74                    | 600             | 13,92                    |
| 75              | 16,77                    |                 |                          |

Table1: Transfer impedance: 1 kHz to 600 MHz, typical data

## RF CURRENT MONITORING PROBE

### 5 Accessory

Tekbox supplies a calibration fixture corresponding with the TBCP4 RF current probe series:



*Picture 2: TBCP4-CAL RF current probe calibration fixture*

### 6 Warning

RF current monitoring probes are primarily used for common mode disturbance measurements, where forward and return current pass the aperture in opposite directions and the magnetic field cancels out. When doing differential mode measurements or just passing a single current carrying wire through the aperture, EUTs with high inrush currents may cause a voltage transient, that might damage the receiver or analyzer frontend. Protect your equipment using attenuators, limiters, or disconnect the RF-input, while powering ON/OFF the EUT.

### 7 Ordering Information

| Part Number | Description   |
|-------------|---|
| TBCP4-500   | Snap on RF current monitoring probe, beech-wood box, calibration protocol |
| TBCP4-CAL   | Calibration fixture for TBCP4 RF current probe series                     |

### 8 History

| Version | Date       | Author     | Changes                              |
|---------|------------|------------|--------------------------------------|
| V 1.0   | 11.12.2020 | Mayerhofer | Creation of the preliminary document |
| V 1.1   | 15.01.2021 | Mayerhofer | Photo update                         |
| V 1.2   | 28.01.2021 | Mayerhofer | Chapter 5 updated                    |
| V 1.3   | 4.08.2021  | Mayerhofer | Correction in table 1                |
| V 1.4   | 26.03.2024 | Mayerhofer | Extended data to 1 kHz – 600 MHz     |
| V 1.5   | 12.07.2025 | Mayerhofer | Chapter 6 added                      |