

RF CURRENT MONITORING PROBE

1 Introduction

The TBCP1-500 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 in the frequency range from 1 kHz to 500 MHz.



Picture 1: TBCP1-500 RF current monitoring probe

The aperture of the RF current monitoring probe is 25 mm. Its transfer impedance is 19 dB Ohm, with a 3 dB bandwidth of 500 MHz.

RF CURRENT MONITORING PROBE

2 Specification

Characterized frequency range: 1 kHz to 500 MHz

Aperture diameter: 25 mm

Outside diameter: 76 mm

Height: 31 mm

Weight: 320 g

Connector type: N female

Transfer impedance: 19 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

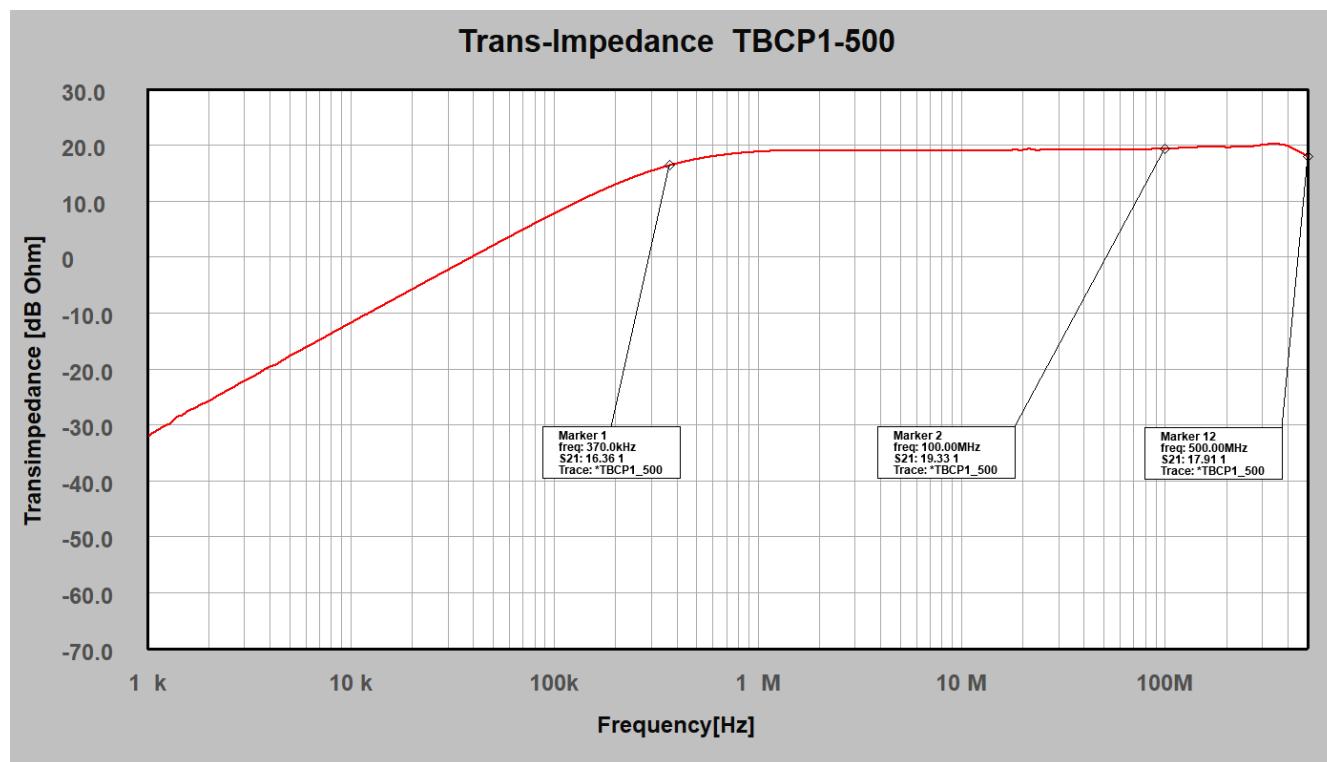


Figure 1: typical transfer impedance: 1 kHz to 500 MHz

RF CURRENT MONITORING PROBE

4 Typical transfer impedance table

The table below shows typical transfer impedance data of a TBCP-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	-32,22	150	19,62
0.0025	-23,79	175	19,68
0.005	-17,75	200	19,57
0.0075	-14,30	225	19,61
0.01	-11,80	250	19,69
0.025	-3,90	275	19,77
0.05	2,03	300	19,99
0.075	5,42	325	20,13
0.1	7,77	350	20,17
0.25	14,34	375	20,04
0.5	17,47	400	19,78
0.75	18,42	410	19,62
1	18,80	420	19,42
2.5	18,96	430	19,20
5	18,95	440	19,00
7.5	18,99	450	18,81
10	19,03	460	18,64
25	19,10	470	18,47
50	19,13	480	18,29
75	19,21	490	18,10
100	19,33	500	17,91
125	19,48		

Table 1: Transfer impedance: 1 kHz to 500 MHz, typical data

RF CURRENT MONITORING PROBE

5 Accessory

Tekbox supplies a calibration fixture corresponding with the TBCP1 current probe series:



Picture 2: TBCP1-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
TBCP1-500	Fixed aperture RF current monitoring probe, wooden box, calibration protocol 1 kHz -500 MHz
TBCP1-CAL	Calibration fixture for TBCP1 series

8 History

Version	Date	Author	Changes
V 1.0	31.05.2020	Mayerhofer	Creation of the document
V 1.1	5.06.2020	Mayerhofer	Correction, chapter 1
V 1.2	19.06.2020	Mayerhofer	Correction, chapter 2
V 1.3	28.1.2021	Mayerhofer	Chapter 5 added
V 1.4	26.3.2024	Mayerhofer	Extended frequency range to 1 kHz -500 MHz
V 1.5	12.7.2025	Mayerhofer	Chapter 6 added