RF CURRENT MONITORING PROBE

1 Introduction

The TBCP3-1000 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 1 GHz and is characterized and usable over the frequency range from 1kHz to 1 GHz.

Picture 1: TBCP3-1000 RF current monitoring probe

The aperture of the RF current monitoring probe is 17 mm. Its transfer impedance is 20 dB Ohm in the flat region and has a 3 dB bandwith from 3 MHz to 1 GHz.

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2 Specification

Characterized frequency range: 1 kHz to 1 GHz
Aperture diameter: 17 mm
Outside diameter: 52 mm
Height: 14 mm
Weight: 55 g
Connector type: SMA female
Transfer impedance: 20 dBΩ in the flat region, typ.
3 dB bandwidth: 3 MHz – 1 GHz, typ.
Max. primary current (RF): 4 A
Max. core temperature: 125 °C

RoHS

3 Transfer impedance

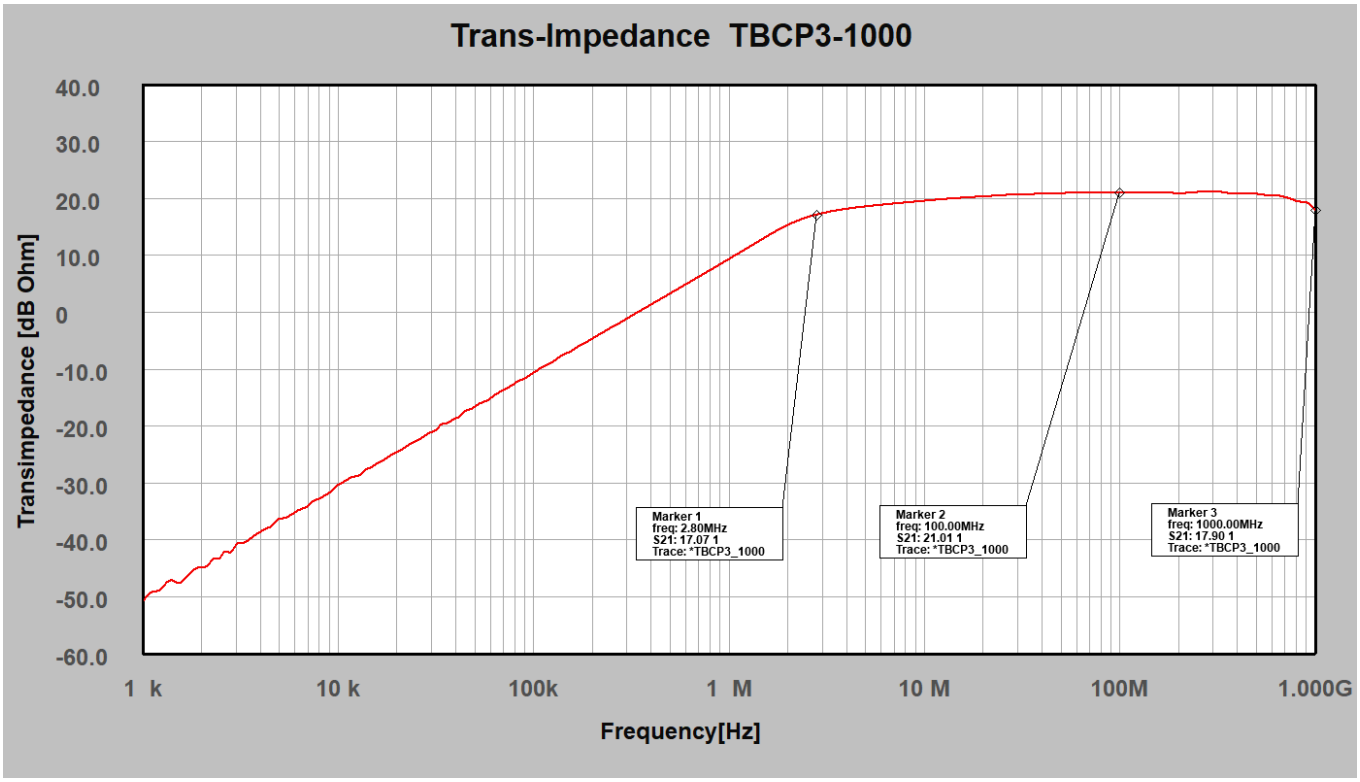

Figure1: typical transfer impedance: 1 kHz to 1000 MHz

4 Typical transfer impedance table

The table below shows typical transfer impedance data of a TBCP3-1000 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 dBΩ subtracted from the analyzer reading in dBµV gives the corrected reading in dBµA.
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	-51,01	325	21,10
0.0025	-43,10	350	20,91
0.005	-36,39	375	20,80
0.0075	-33,20	400	20,82
0.01	-30,41	425	20,87
0.025	-22,70	450	20,88
0.05	-16,69	475	20,86
0.075	-13,21	500	20,77
0.1	-10,70	525	20,61
0. 25	-2,72	550	20,54
0.5	3,23	575	20,49
0.75	6,76	600	20,42
1	9,28	625	20,40
2.5	16,59	650	20,41
5	18,52	675	20,31
7.5	19,13	700	20,16
10	19,53	725	20,00
25	20,46	750	19,85
50	20,86	775	19,69
75	21,02	800	19,47
100	21,01	825	19,37
125	21,02	850	19,34
150	21,02	875	19,29
175	20,93	900	19,23
200	20,87	925	19,03
225	20,92	950	18,69
250	21,06	975	18,24
275	21,11	1000	17,90
300	21,18		

Table1: Transfer impedance, 1 kHz to 1000 MHz, typical data

5 Accessory

Tekbox supplies a calibration fixture corresponding with the TBCP3 current monitoring probe:

Picture 2: TBCP3-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
TBCP3-1000	TBCP3 RF current monitoring probe, wooden box, calibration protocol 1 kHz – 1 GHz
TBCP3-CAL	Calibration fixture for TBCP3 current probe series

8 History

Version	Date	Author	Changes
V 1.0	5.1.2021	Mayerhofer	Creation of the preliminary document
V 1.1	28.1.2021	Mayerhofer	Chapter 5 updated
V 1.2	26.3.2024	Mayerhofer	Extended data to 1 kHz – 1 GHz
V 1.3	12.7.2025	Mayerhofer	Chapter 6 added

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