RF CURRENT MONITORING PROBE

1 Introduction

The TBCP4-250 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 300 MHz and is characterized and usable over the frequency range from 1kHz to 400 MHz.

Picture 1: TBCP4-250 RF current monitoring probe

The aperture of the RF current monitoring probe is 32 mm. Its transfer impedance is 13 dB Ohm in the flat region with a typical 3 dB bandwidth of 200 kHz - 300 MHz.

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2 Specification

Characterized frequency range: 1 kHz to 400 MHz
Aperture diameter: 32 mm
Outside diameter: 73 mm
Height: 20 mm
Weight: 320 g
Connector type: N female
Transfer impedance: 13 dBΩ in the flat region, typ.
3 dB bandwidth: 200 kHz – 300 MHz, typ.
Max. primary current (RF): 3 A
Max. core temperature: 125 °C

RoHS

3 Transfer impedance

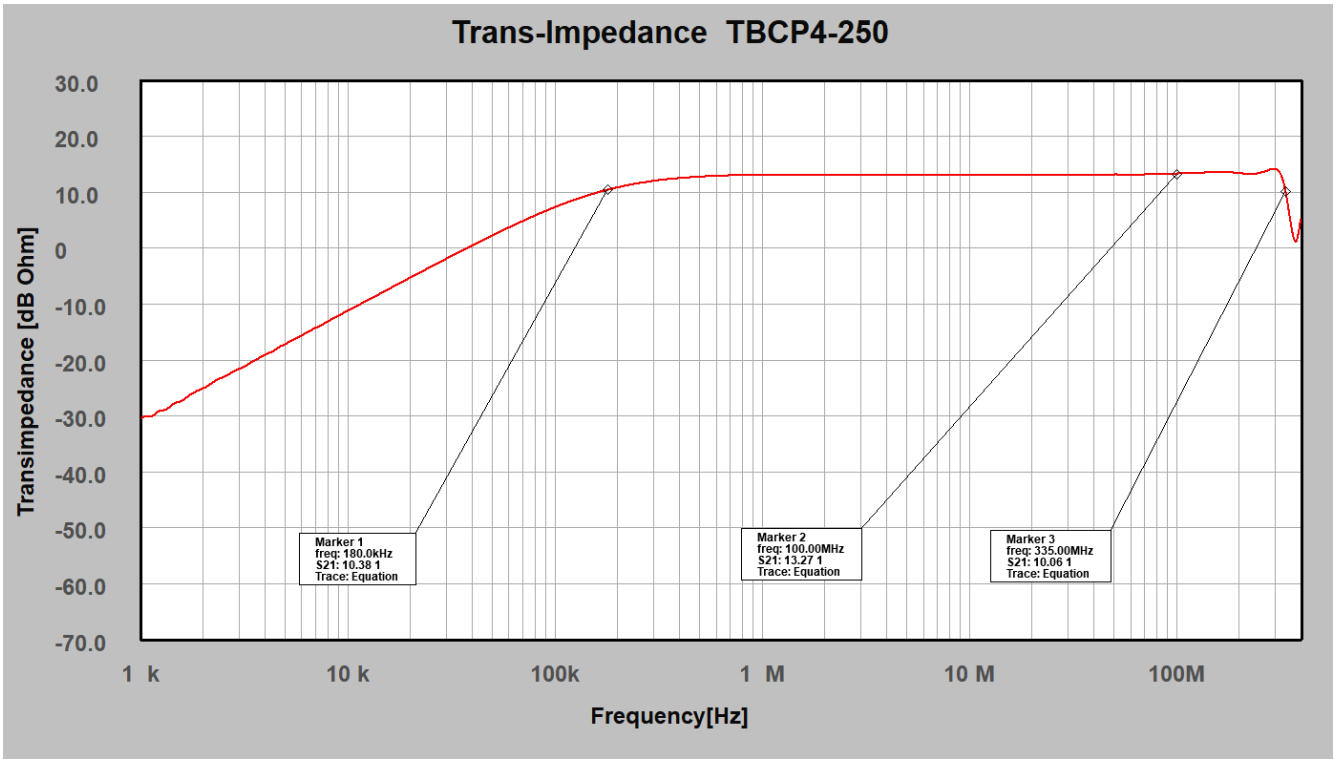

Figure2: typical transfer impedance: 1 kHz to 400 MHz

4 Typical transfer impedance table

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The table below shows typical transfer impedance data of a TBCP4-250 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	-30,59	25	13,05
0.0025	-23,17	50	13,10
0.005	-17,24	75	13,13
0.0075	-13,80	100	13,27
0.01	-11,27	125	13,40
0.0125	-9,37	150	13,49
0.015	-7,81	175	13,48
0.0175	-6,49	200	13,32
0.02	-5,37	225	13,19
0.025	-3,47	250	13,35
0.05	2,22	260	13,51
0.075	5,29	270	13,70
0.1	7,25	280	13,94
0.125	8,60	290	14,11
0.15	10,26	300	14,07
0.175	10,78	310	13,69
0.2	11,96	320	12,82
0.25	12,46	330	11,21
0.5	12,72	340	8,73
0.75	12,98	350	5,81
1	13,06	360	3,05
2.5	12,99	370	1,28
5	12,99	380	1,40
7.5	13,01	390	3,39
10	13,04	400	6,34

Table1: Transfer impedance: 1 kHz to 400 MHz, typical data

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
TBCP4-250	TBCP4 RF current monitoring probe, beech-wood box, calibration protocol
TBCP4-CAL	Calibration fixture for TBCP4 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	28.1.2021	Mayerhofer	Chapter 5 updated
V 1.3	26.3.2024	Mayerhofer	Extended frequency range to 1 kHz – 400 MHz
V 1.4	12.7.2025	Mayerhofer	Chapter 6 added

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