RF SURFACE CURRENT MONITORING PROBE

1 Introduction

The TBSCP1-10M500 is a RF surface current monitoring probe, expanding the Tekbox product range of affordable EMC pre-compliance test equipment.
The probe has a very flat response from 10MHz to 500 MHz and is characterized over the frequency range from 30 kHz to 600 MHz. The TBSCP1-10M500 is for RF current monitoring applications that need to measure RF currents flowing on surfaces such as PCB groundplanes or traces, metal planes or wires.

Picture 1: TBSP1-10M500 RF current monitoring probe

The footprint of the RF current monitoring probe measures 40 mm x 15 mm. The transfer impedance is -5 dB Ohm with a typical 3dB bandwidth from 10 MHz to 500 MHz.

2 Specification

Characterized frequency range: 30 kHz to 600 MHz
Transfer impedance: -5 dB Ohm with a 3 dB bandwidth from 10 MHz to 500 MHz
Suppression of orthogonal field: typ. > 15 dB avg. up to 100 MHz
Footprint: 40 mm x 15 mm
Height: 30 mm
Weight: 25 g
Connector type: SMA female
Max. primary current (DC - 400 Hz): 150 A
Max. primary current (RF): 12 A
Max. core temperature: 125 °C

RoHS

3 Transfer impedance

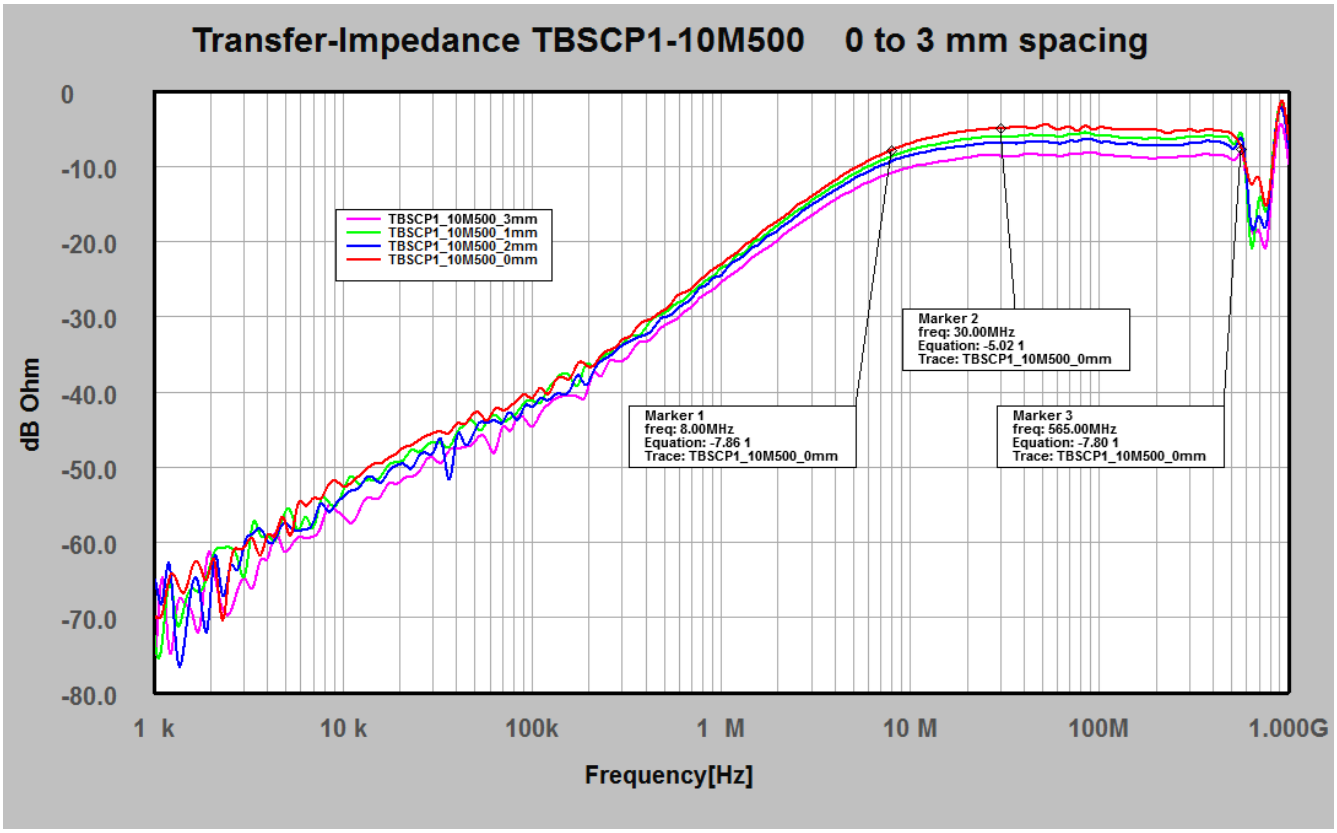

Figure1: typical transfer impedance, curves for direct surface contact and 1 mm, 3 mm, 10mm spacing between probe and measured surface

4 Calibration

Place the probe on top of a 50 Ohm microstripline, terminated with 50 Ohm. Connect the microstripline to port 1 of a VNA and connect port 2 to the SMA connector of the probe. Measure S21 and add 34 dB to get the trans-impedance in dB Ohm.

5 Typical transfer impedance table

The table below shows typical transfer impedance data of a TBSCP1-10M500 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]
0.03	-46.38	125	-5.11
0.05	-42.82	150	-5.16
0.075	-42.17	175	-5.19
0.1	-40.91	200	-5.22
0.25	-34.63	225	-5.63
0. 5	-29.20	250	-5.33
0.75	-25.56	275	-5.31
1	-23.09	300	-5.17
2	-17.30	325	-5.38
3	-14.07	350	-5.30
4	-11.93	375	-5.15
5	-10.39	400	-5.24
6	-9.33	425	-5.34
7	-8.53	450	-5.40
8	-7.86	475	-5.50
9	-7.37	500	-5.77
10	-6.99	525	-6.25
25	-5.12	550	-7.05
50	-4.56	575	-8.46
75	5.34	600	-10.56
100	-4.89		

Transfer impedance: 30 kHz to 600 MHz, typical data

6 Ordering Information

Part Number	Description
TBSCP1-10M500	RF surface current monitoring probe, beech-wood box, calibration protocol 30 kHz – 600 MHz

7 History

Version	Date	Author	Changes
V 1.0	13.7.2022	Mayerhofer	Creation of the preliminary document
V 1.1	16.11.2023	Mayerhofer	Chapter 1 updated

www.tekbox.com
TekBox Digital Solutions Vietnam Pte. Ltd.
Factory 4, F4, Lot I-3B-1, Saigon Hi-Tech Park, Tan Phu Ward, District 9, Ho Chi Minh City, Vietnam