

Product Datasheet - Technical Specifications



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COAXIAL RF CURRENT MONITORING PROBE

1 Introduction

The TBCCP1-400K600 is a coaxial RF current monitoring probe, expanding the Tekbox product range of affordable EMC pre-compliance test equipment.

The probe has a 3 dB bandwidth from 400 kHz to 600 MHz and a very flat response from 1 MHz to 200 MHz. The transimpedance is characterized over the frequency range from 10 Hz to 100 MHz. The TBCCP1-400K600 is primarily designed as transducer for passive loop antennas or for measurement of RF currents in coaxial cables.



Picture 1: TBCCP1-3K100 RF current monitoring probe

The probe is equipped with N-connectors. An attachment with a 1/4" thread permits connectivity to standard tripods.

2 Specification

Characterized frequency range:	10 Hz to 600 MHz
Transfer impedance:	23 dB Ohm
3 dB bandwidth:	400 kHz to 600 MHz, typ.
Dimensions:	76 mm x 102 x 69 mm
Weight:	400 g
Connector type:	N female
Max. primary current (RF):	12 A
Max. core temperature:	125 °C



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3 Transfer impedance

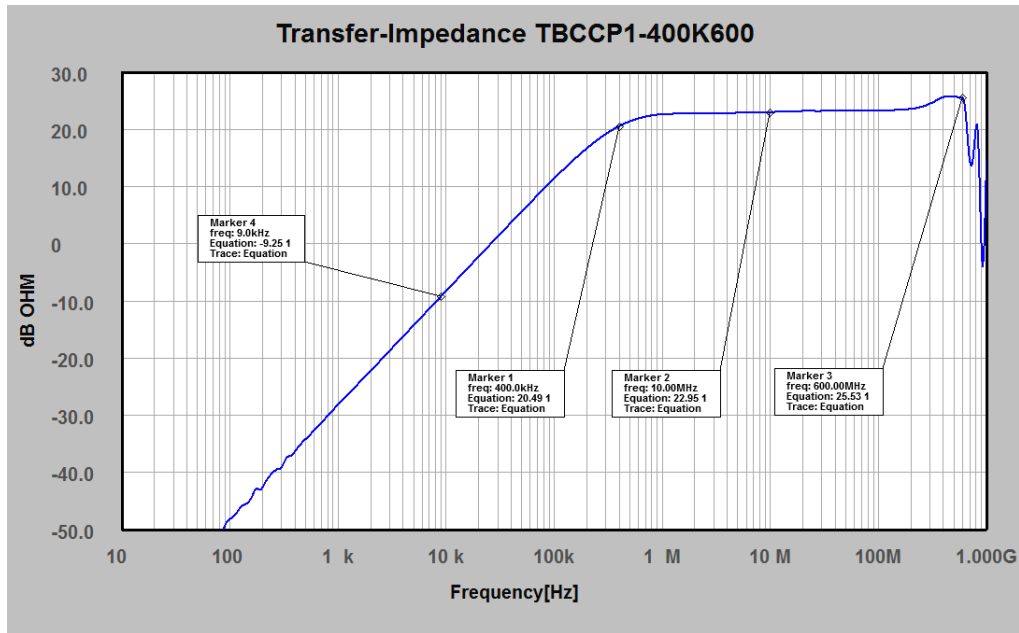


Figure 1: transfer impedance, 10 Hz – 1 GHz, typical data

4 Coaxial Path – Insertion loss (S21)

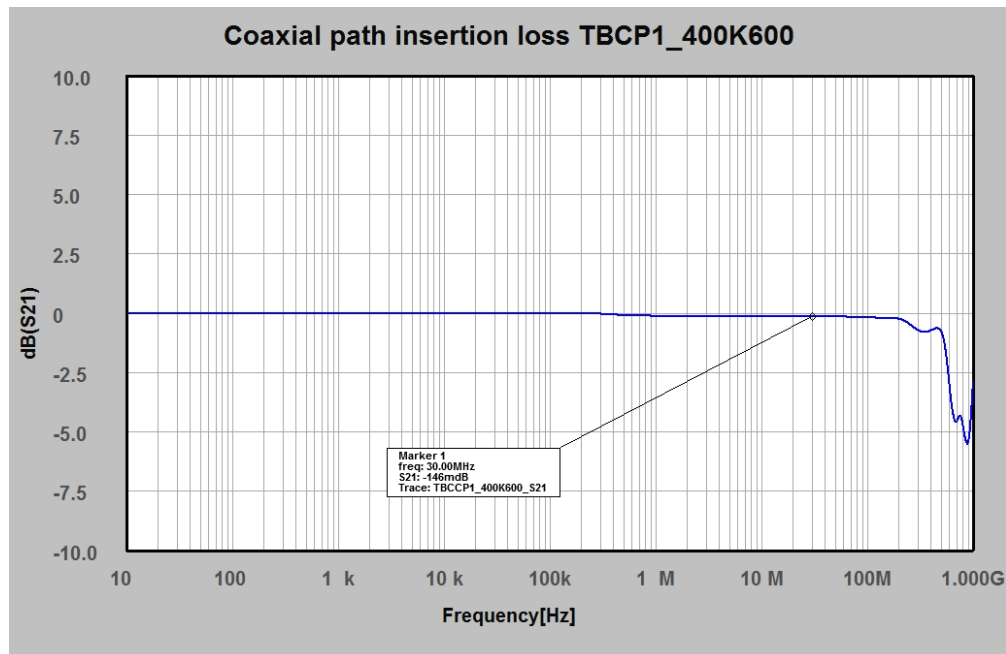


Figure 2: S21, insertion loss of the coaxial path, 10 Hz – 1 GHz, typical data

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5 Coaxial Path – Matching (S11)

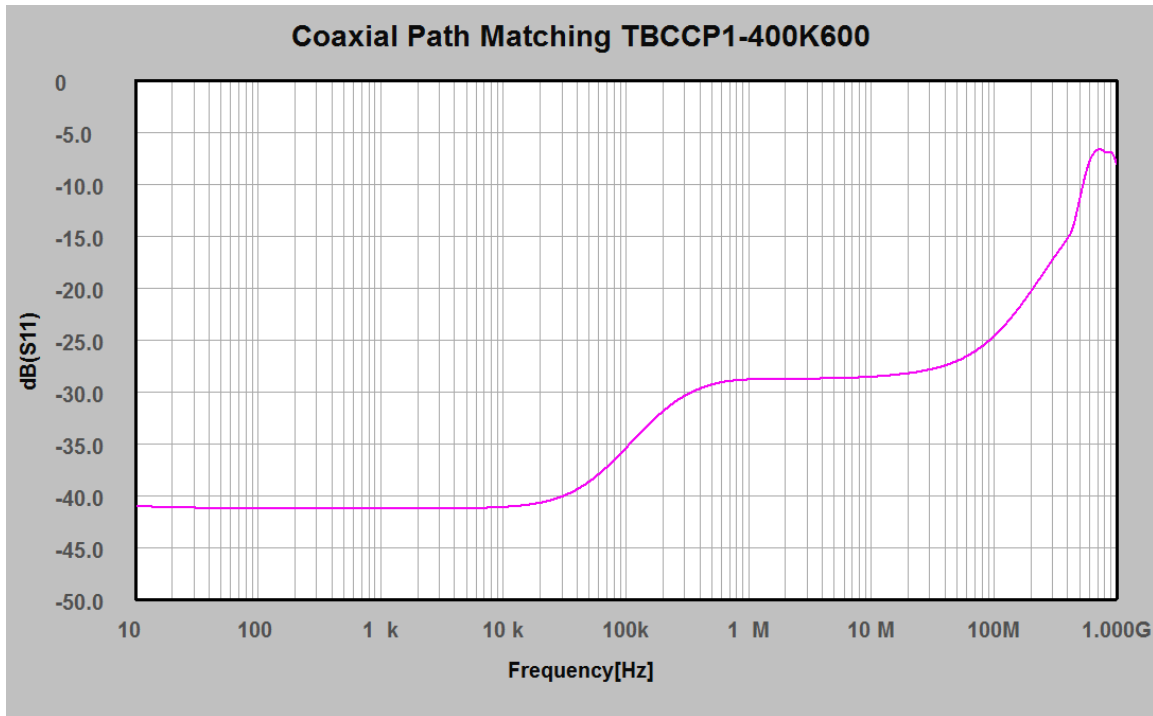


Figure 3: S11, impedance matching of the coaxial path, 10 Hz – 1 GHz, typical data

6 Application

The TBCCP1-400K600 is primarily designed as current transducer for passive loop antennas. It will provide a low antenna factor / good sensitivity over a wide frequency range.

Combined with a 185 cm length slotted coaxial cable, it will form a passive loop antenna with a diameter of 60 cm. The magnetic antenna factor will have a value of approximately -18 dBS/m.

When used as transducer for a passive antenna, a typical sensitivity of -22 dB μ A/m can be achieved. This is sufficient for all CISPR xx radiated emission measurements in the frequency range from 9 kHz to 30 MHz.

For more details, download the application note *Loop Antenna Basics.pdf* from the Tekbox website.

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7 Typical transfer impedance table

The table below shows typical transfer impedance data of a TBCCP1-400K600 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 dB Ω subtracted from the analyzer reading in dB μ V gives the corrected reading in dB μ A.

Refer to the application notes of EMCview on how to create a current probe correction file, download a file with typical data from the Tekbox website or simply select the file from the installed correction file directory.

Frequency [MHz]	transfer impedance [dB Ω]	Frequency [MHz]	transfer impedance [dB Ω]
0.00001	-62.56	1	22.57
0.000025	-58.21	2.5	22.74
0.00005	-56.10	5	22.82
0.000075	-50.92	7.5	22.89
0.0001	-48.21	10	22.95
0.00025	-40.06	20	23.15
0.0005	-34.26	30	23.19
0.00075	-30.77	40	23.25
0.001	-28.20	50	23.26
0.00125	-26.37	55	23.26
0.0015	-24.76	60	23.25
0.00175	-23.49	65	23.26
0.002	-22.30	70	23.25
0.00225	-21.29	75	23.24
0.0025	-20.39	80	23.24
0.005	-14.34	85	23.25
0.0075	-10.83	90	23.24
0.01	-8.33	95	23.24
0.025	-0.39	100	23.24
0.05	5.55	200	23.51
0.075	8.98	300	24.41
0.1	11.34	400	25.57
0.25	18.04	500	25.70
0.5	21.32	550	25.53
0.75	22.28	600	25.53

Table1: Transfer impedance: 10 Hz to 600 MHz, typical data

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8 Calibration

Tekbox coaxial RF current probes do not need a calibration fixture for the measurement of the transfer impedance.

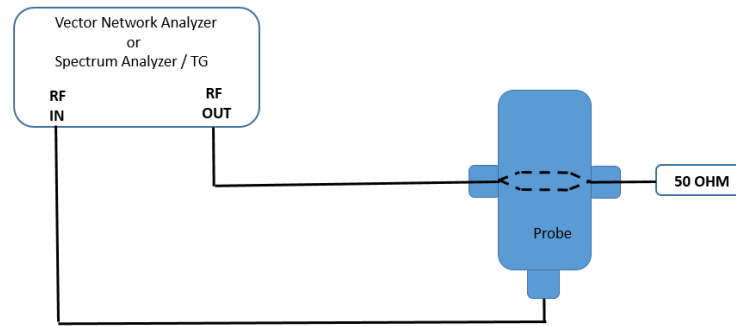


Figure 4: S21, transimpedance measurement set up

Calculate the transfer impedance Z_T using the formula below:

$$Z_T [\text{dB}\Omega] = P_{\text{in}} [\text{dBm}] - P_{\text{probe}} [\text{dBm}] + 34 \text{ dB}$$

or simply

$$Z_T [\text{dB}\Omega] = S21 [\text{dB}] + 34 \text{ dB}$$

9 Ordering Information

Part Number	Description
TBCCP1-400K600	RF surface current monitoring probe, beech-wood box, calibration protocol 1kHz – 400 MHz

10 History

Version	Date	Author	Changes
V 1.0	1.7.2022	Mayerhofer	Creation of the preliminary document