RF CURRENT MONITORING PROBE

1 Introduction

The TBCP2-20M700 is a snap-on RF current monitoring probe, expanding the Tekbox product range of affordable test equipment.
The probe is characterized over the frequency range from 10 kHz to 800 MHz. It has a typical transfer impedance of 21 dBΩ and a 3dB bandwidth from 25 MHz – 700 MHz.

Picture 1: TBCP2-20M700 RF current monitoring probe

The aperture of the RF current monitoring probe is 32 mm. It is equipped with a hinge for easy installation.

RF CURRENT MONITORING PROBE

2 Specification

Characterized frequency range:	10 kHz to 800 MHz
3dB bandwidth:	20 MHz – 700 MHz
Transfer impedance:	20 dBΩ, typ.
Max. primary current (DC - 400Hz):	100 A
Max. primary current (RF):	15 A
Max. pulse current:	300 A
Current-time product:	0.001 As
Max. core temperature:	125 °C
Connector type:	N female
Aperture diameter:	32 mm
Outside diameter:	73 mm
Height:	20 mm
Weight:	320 g

RoHS

3 Transfer impedance

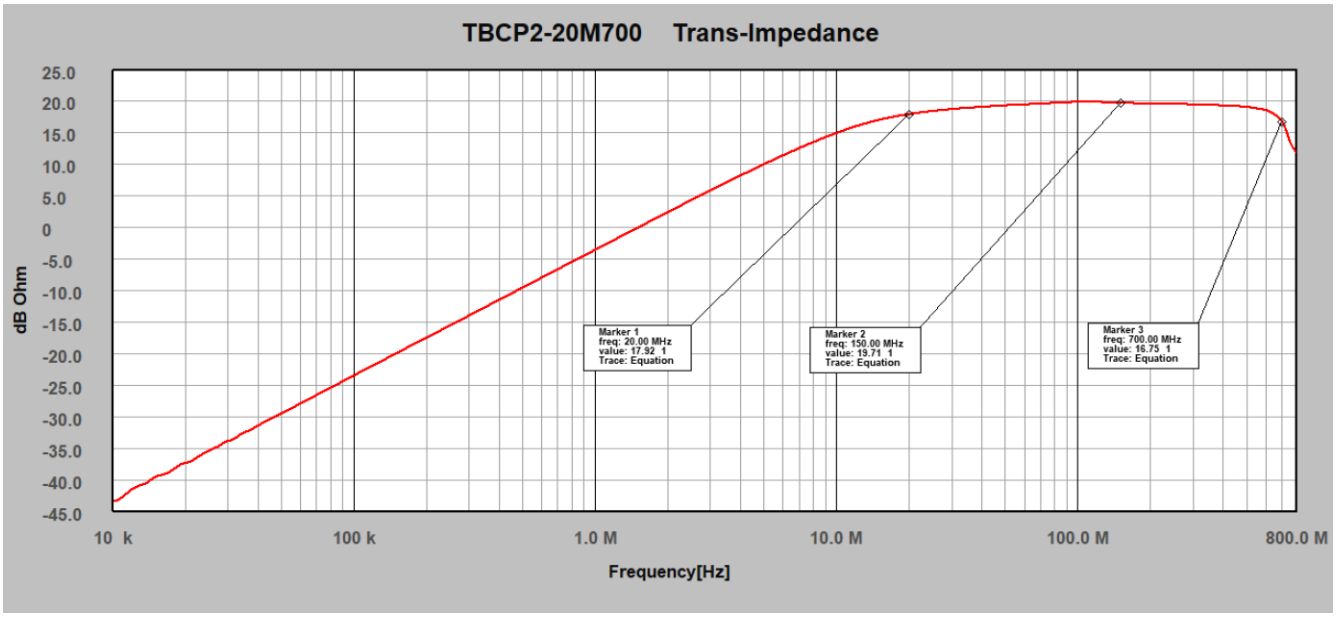

Figure1: typical transfer impedance: 10 kHz to 800 MHz

4 Typical transfer impedance table

The table below shows typical transfer impedance data of a TBCP2-20M700 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 EMCview application notes on how to create a current probe correction file.

Frequency [MHz]	Transfer impedance [dBΩ]	Frequency [MHz]	Transfer impedance [dBΩ]
0,01	-43,54	275	19,49
0,025	-35,50	300	19,46
0,05	-29,54	325	19,42
0,075	-26,02	350	19,39
0,1	-23,54	375	19,33
0,25	-15,61	400	19,29
0,5	-9,60	425	19,24
0,75	-6,08	450	19,19
1	-3,60	475	19,13
2,5	4,27	500	19,05
5	9,96	525	18,94
7,5	13,01	550	18,82
10	14,93	575	18,68
25	18,41	600	18,52
50	19,31	625	18,25
75	19,64	650	17,86
100	19,88	675	17,44
125	19,82	700	16,75
150	19,71	725	15,40
175	19,64	750	13,77
200	19,59	775	12,62
225	19,56	800	11,88
250	19,53		

Table1: Transfer impedance: 10 kHz to 800 MHz, typical data

5 Transfer impedance with different supply currents

RF current monitoring probes are primarily used for common mode disturbance measurements, where forward and return supply current pass the aperture in opposite directions and the magnetic field of the supply current cancels out. Therefore, the supply currents' amplitude is irrelevant in common mode configurations.

When measuring differential mode currents or currents on single conductors, the magnetic field generated by DC currents or AC supply currents will cause core saturation at certain levels.
However, the probe's inductance begins to drop even before it reaches saturation. At lower frequencies, this results in a reduction of the probe trans-impedance.

The plot below shows the behaviour of the trans-impedance of the TBCP2-20M700 for supply currents up to 200A in the frequency range from DC to 400 Hz.

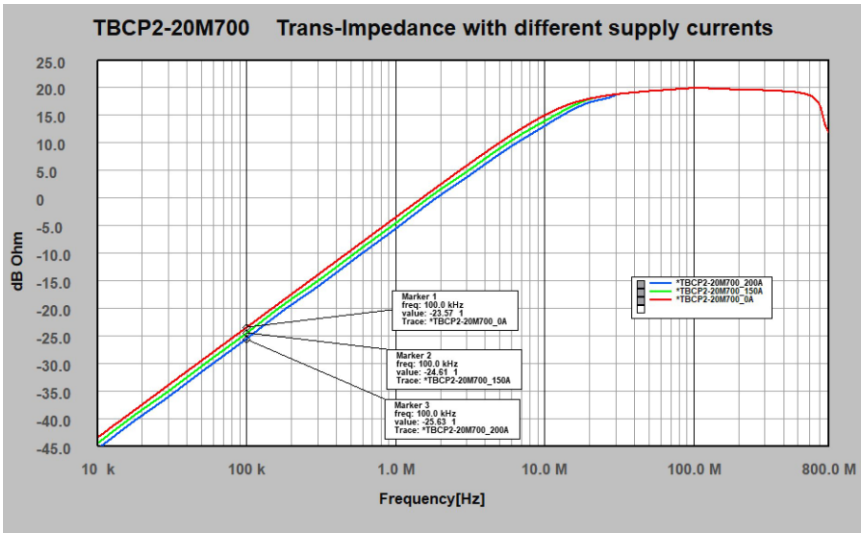

Figure2: transfer impedance versus supply current

6 Accessory

Tekbox supplies a calibrator corresponding with the TBCP2 series of snap on current probes:

Picture 2: TBCP2-CAL RF current probe calibration fixture

7 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.

8 Ordering Information

Part Number	Description
TBCP2-20M700	Snap on RF current monitoring probe, wooden box, calibration protocol 1 MHz – 1 GHz
TBCP2-CAL	Calibration fixture for TBCP2 current probe series

9 History

Version	Date	Author	Changes
V 1.0	22.8.2025	Mayerhofer	Creation of the preliminary document