

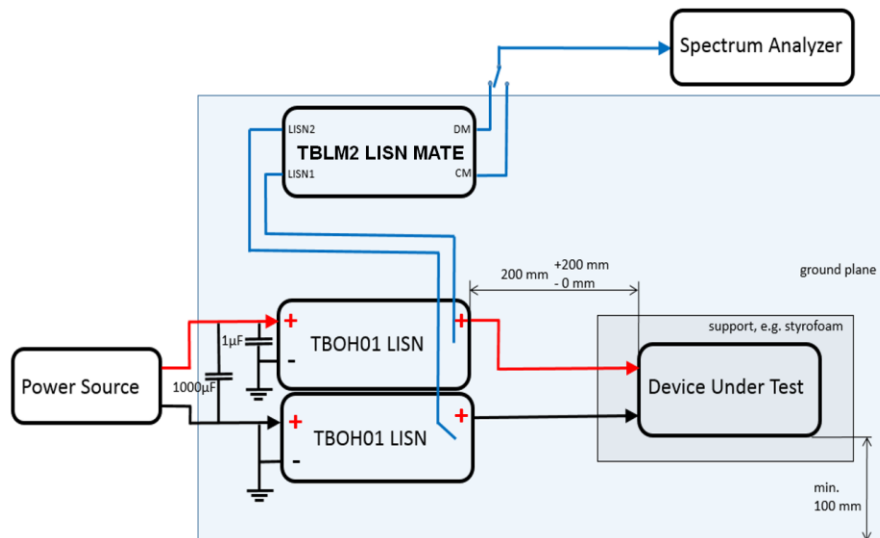
# LISN-MATE

## 1 Introduction

The TBLM2 is a Common Mode / Differential Mode - separator companion device for LISN. The LISN Mate is connected to the output of a LISN inserted into the positive supply line and to a second LISN inserted into the negative supply line. The conducted noise signal at the output of a LISN is the sum of common mode and differential mode noise. The LISN mate separates it into the common mode and differential mode components, with each signal component available at a separate BNC port. The TBLM2 can be used in the frequency range from 9 kHz to 110 MHz.



Picture 1: LISN MATE



Picture 2: set up for the measurement of differential mode and common mode conducted noise;  
terminate the unused LISN mate output port with 50 Ohm

# LISN-MATE

## 2 Parameters

Nominal frequency range: 150 kHz – 100 MHz

Usable frequency range: 9kHz – 110 MHz

Port impedance

$ Z_{LISN1} ,  Z_{LISN2} ,  Z_{CM} $ :	150 kHz – 1 MHz: 30...55 Ohm
	1 MHz -30 MHz: 50...60 Ohm
	30 MHz – 100 MHz: 50....70 Ohm
$ Z_{DM} $ :	150 kHz – 1 MHz: 30...50 Ohm
	1 MHz -30 MHz: 40....50 Ohm
	30 MHz – 100 MHz: 40....70 Ohm

$|Z_{LISN1}|$ : independent of the termination at the LISN2 port

$|Z_{LISN2}|$ : independent of the termination at the LISN1 port

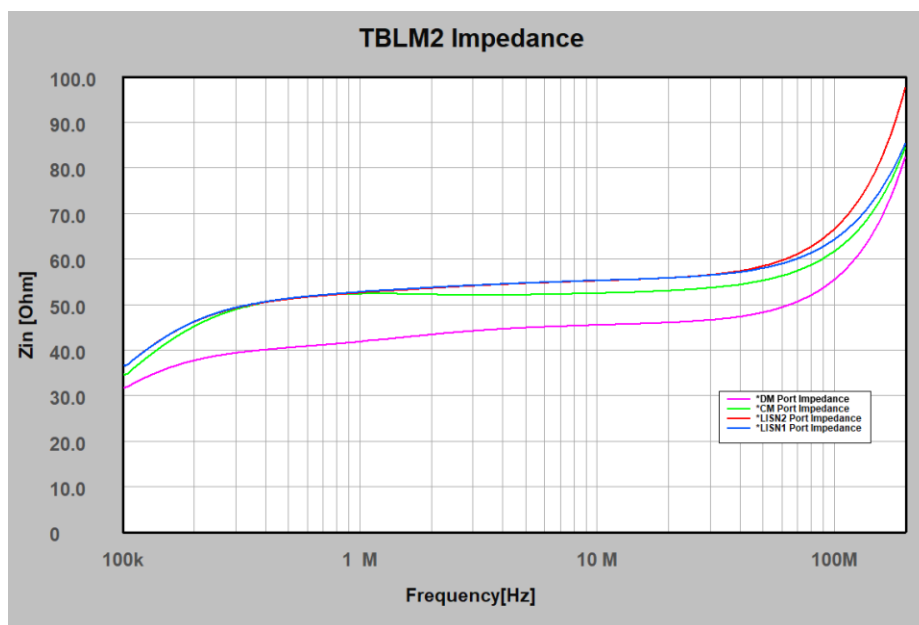
$|Z_{CM LISN1-LISN2}|$ : 25 Ohm nominal

$|Z_{DM LISN1-LISN2}|$ : 100 Ohm nominal

Maximum RF level at any BNC port: 27dBm

Maximum DC current at any BNC port: 30 mA

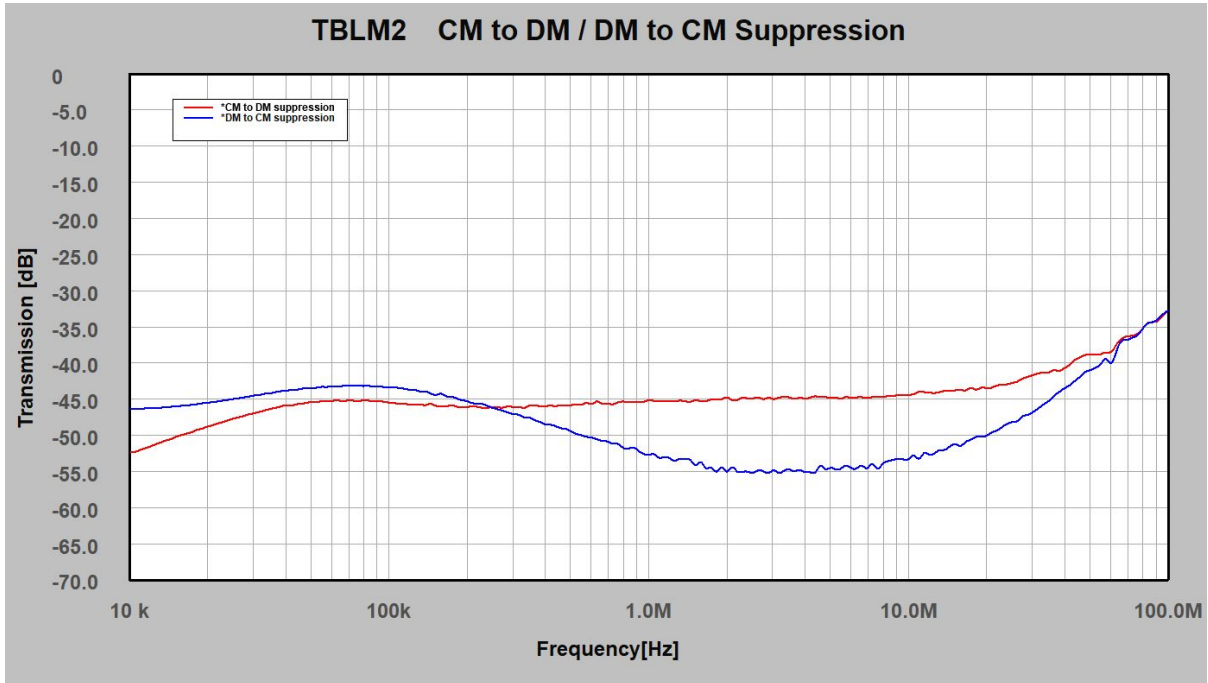
### 2.1 Impedance plot



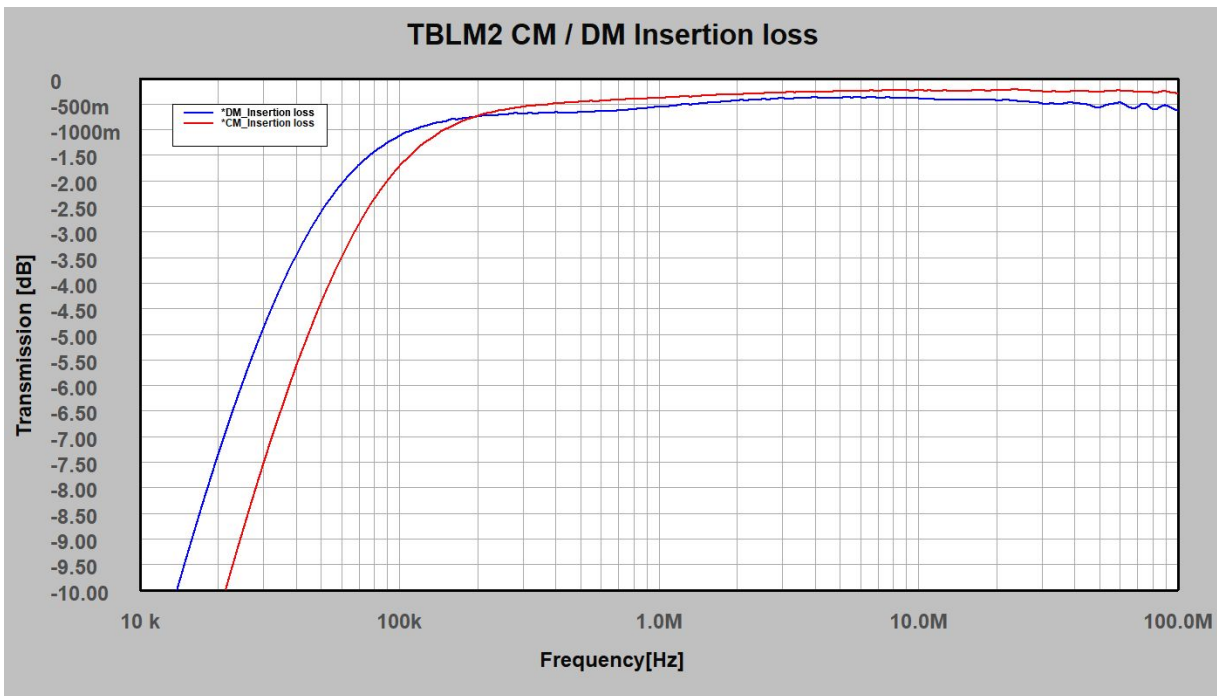
Picture 3: LISN MATE Port Impedances, 10 kHz – 200 MHz

# LISN-MATE

## 2.2 Frequency response



Picture 3: LISN MATE DM/CM - suppression



Picture 4: DM/CM insertion loss

## LISN-MATE

Common mode insertion loss: input signal split into two same phase components and applied to LISN1 and LISN2 port; output signal measured at common mode port.

Differential mode insertion loss: input signal split into two 180° phase shift components and applied to LISN1 and LISN2 port; output signal measured at differential mode port.

Differential mode suppression at CM output: input signal split into two 180° phase shift components and applied to LISN1 and LISN2 port; output signal measured at common mode port.

Common mode suppression at DM output: input signal split into two same phase components and applied to LISN1 and LISN2 port; output signal measured at differential mode port.

Frequency [MHz]	DM insertion loss [dB]	CM insertion loss [dB]	DM supression [dB] at CM port	CM supression [dB] at DM port
0.009	-13,65	-16,94	-47,01	-53,78
0.01	-12,22	-15,78	-46,41	-52,34
0.025	-5,92	-8,81	-45,04	-47,78
0.05	-2,60	-4,37	-43,54	-45,46
0.075	-1,55	-2,58	-43,20	-45,32
0.1	-1,13	-1,72	-43,38	-45,53
0.15	-0,84	-1,00	-44,48	-45,92
0.25	-0,71	-0,62	-46,25	-46,18
0.5	-0,66	-0,46	-49,50	-45,92
0,75	-0,62	-0,41	-51,20	-45,61
1	-0,56	-0,38	-52,76	-45,22
5	-0,39	-0,25	-54,57	-44,89
10	-0,39	-0,23	-53,36	-44,47
20	-0,43	-0,24	-50,12	-43,54
30	-0,50	-0,25	-46,89	-41,75
40	-0,48	-0,24	-43,54	-40,75
50	-0,57	-0,27	-41,05	-38,86
60	-0,48	-0,24	-40,13	-38,57
70	-0,56	-0,26	-36,84	-36,36
80	-0,61	-0,27	-35,28	-35,24
90	-0,53	-0,26	-34,14	-34,33
100	-0,63	-0,29	-32,78	-32,82
110	-0,56	-0,31	-30,56	-30,63

Table 1 – Frequency Response

# LISN-MATE

## 3 Ordering Information

Part Number	Description
TBLM2	LISN Mate; 1 piece BNC termination; 2 pieces BNC-male to BNC male cables, 35cm, RG223; individual test protocol

Table 2 – Ordering Information

## 4 History

Version	Date	Author	Changes
V1.0	17.6.2024	Mayerhofer	Creation of the document
V1.1	2.1.2025	Mayerhofer	Corrected chapter 2.2

Table 3 – History