

# 2 $\mu$ H Line Impedance Stabilisation Network

## 1 Introduction

The TBL0225-2 LISN is a two-paths 50  $\Omega$  // 2  $\mu$ H LISN characterized from 10Hz – 200 MHz. It is based on the standard ECSS-E-ST-20-07C Rev 1. The standard provides the general schematic of the LISN and allows for some flexibility in component values. The TBL0225-2 implementation aims for use in EMC measurements of satellites and spacecraft. The LISN does not have an output for conducted emission measurements; instead, it merely functions as a network for line impedance stabilisation. An RF current monitoring probe is used to measure conducted emissions, according to the standard.

The 2  $\mu$ H inductor mimics the typical inductance of the supply wire harness in spacecraft or satellites. The LISN is inserted into the power line and power return line of the EUT.



## 2 Parameters

LISN type: V-AMN, 50  $\Omega$  // 2  $\mu$ H

Characterized frequency range: 10 Hz – 200 MHz

DC Resistance: 100 m $\Omega$  per path

Maximum current: 25 A continuous

Operating voltage range: 0 – 60V DC

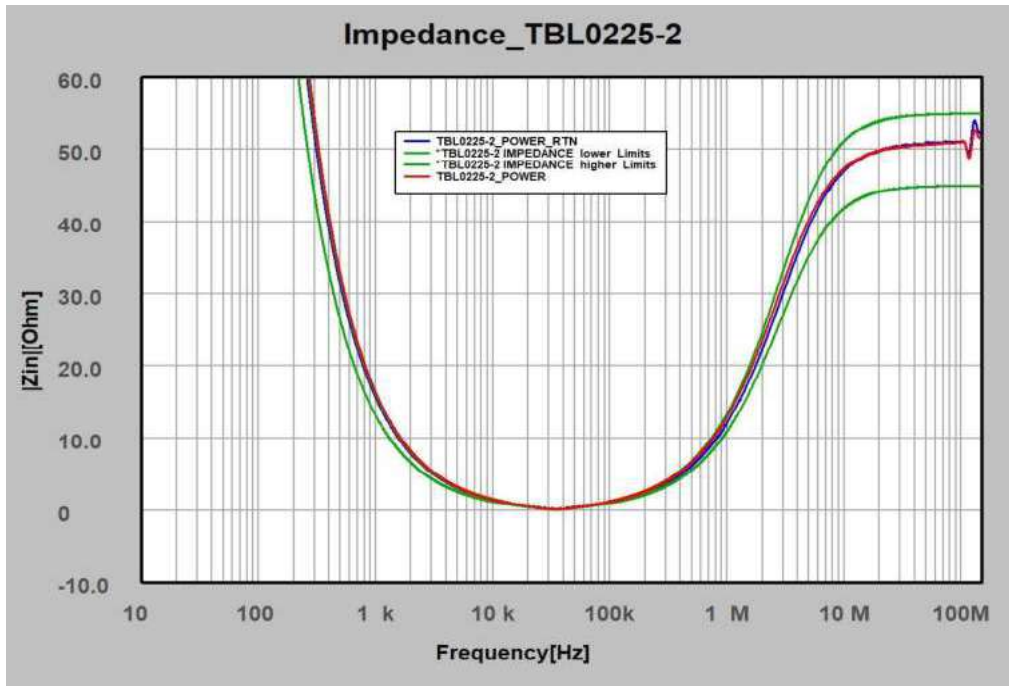
EUT / SOURCE terminals: 4 mm banana sockets

Dimensions: W 260 mm x L 140 mm x H 150 mm

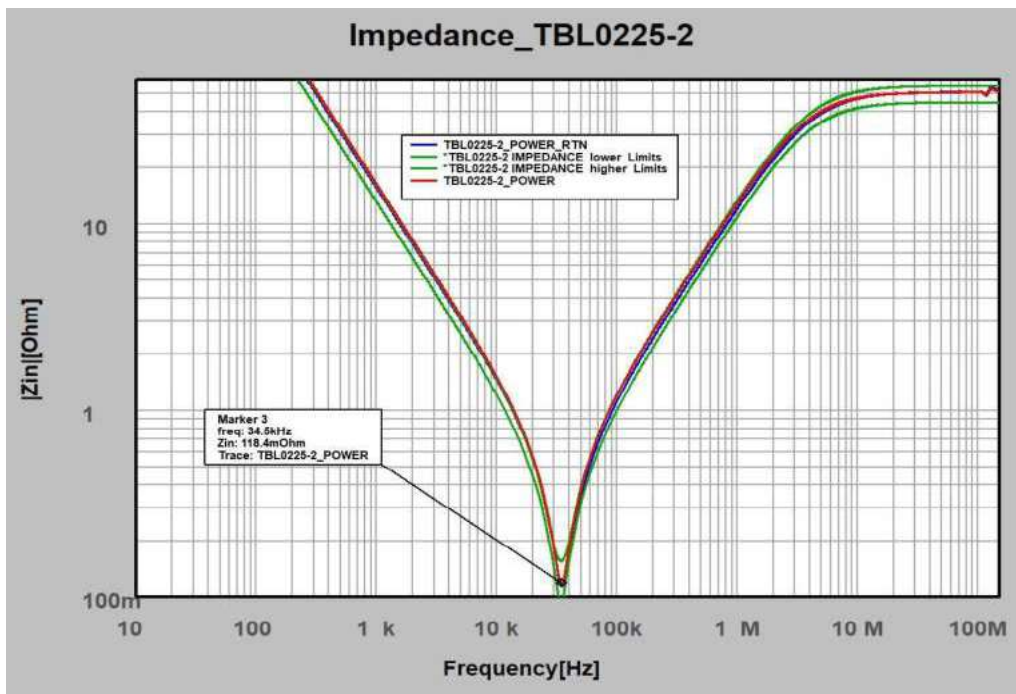
Weight: 4.1 kg

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### 3 Impedance



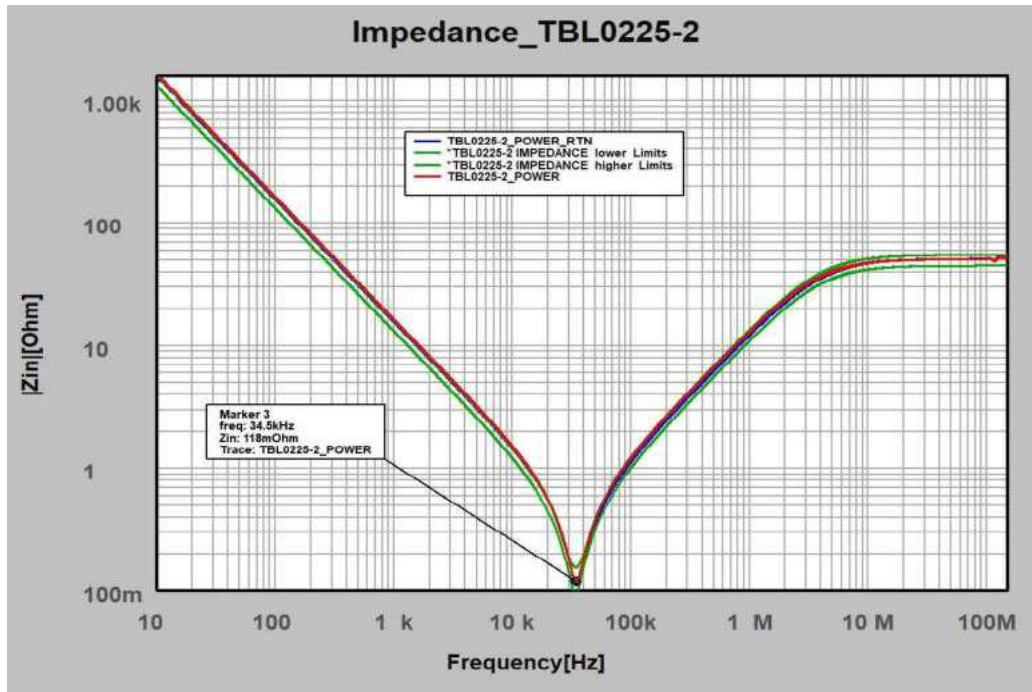
Impedance: 10Hz – 200 MHz; source terminals open, typical data



Impedance: 10 Hz – 200 MHz; logarithmic impedance axis, source terminals open, typical data

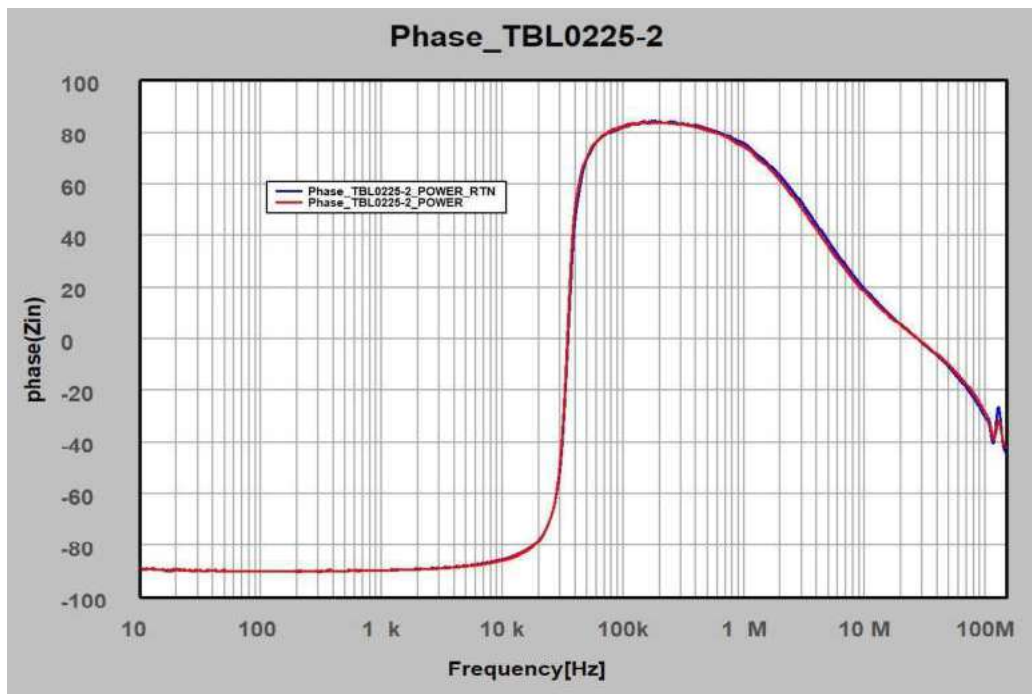
The standard does not specify impedance limits. The green traces represent a  $\pm 10\%$  tolerance band of the simulated impedance (ideal components/no parasitics);

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Impedance: 10 Hz – 200 MHz; logarithmic impedance axis, source terminals open, typical data

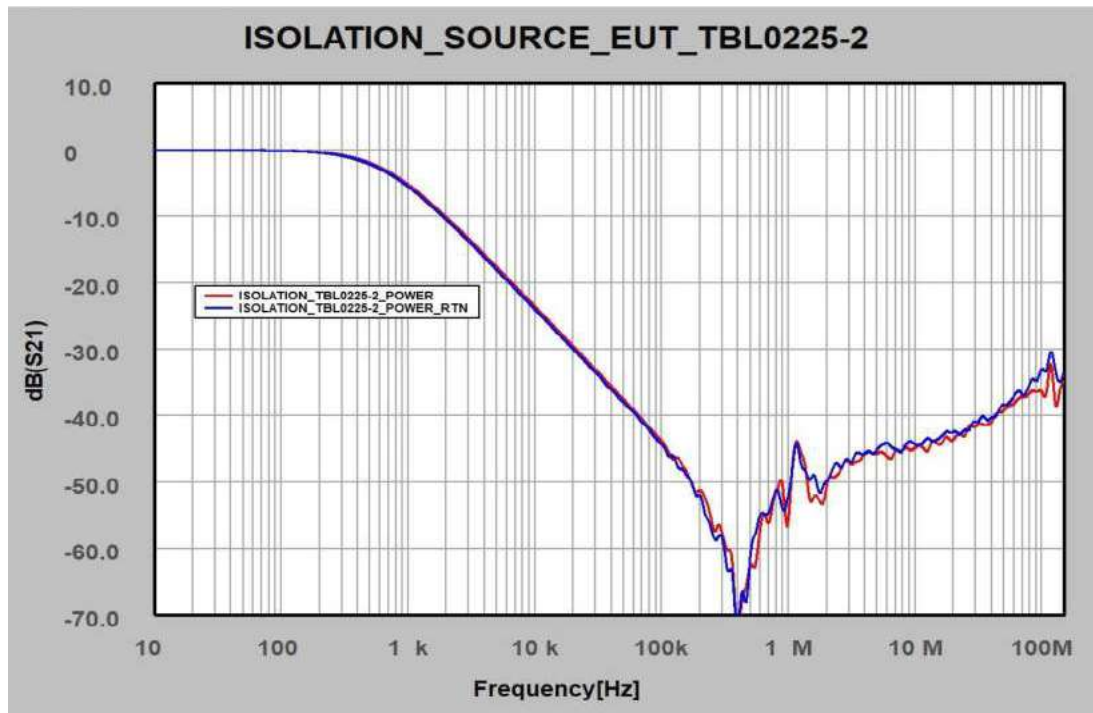
### 4 Phase



Input phase: 10 Hz – 200 MHz; source terminals open, typical data

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### 5 Isolation



Isolation from SOURCE terminals to EUT terminals: 10 Hz – 200 MHz, typical data

### 6 Principle Schematics

In order to reproduce the system power bus impedance and to standardize the measurement conditions used in different test sites, emissions and susceptibility measurements on primary power lines shall be performed on inserting a Line Stabilization Network (LISN) between the EGSE power supply and the unit under test. The LISN schematic and the relevant impedance versus frequency are chosen in accordance with the bus impedance mask. The design of the LISN is usually provided by the spacecraft contractor. In case it is not available in time the LISN schematic and the relevant impedance versus frequency given below shall be used.  
Prior to test, the network impedance shall be measured in the relevant frequency range and attached to the test report.

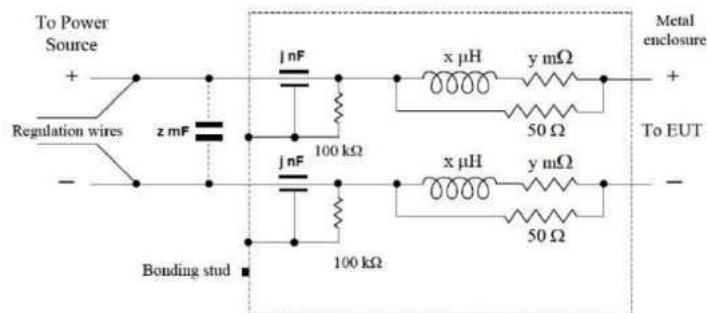


Figure 5-2: LISN schematic

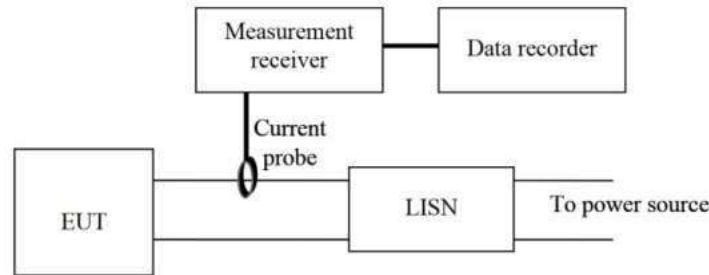
$$X = 2 \mu\text{H} \quad Y = 100 \text{ m}\Omega \quad j = 11 \mu\text{F}$$

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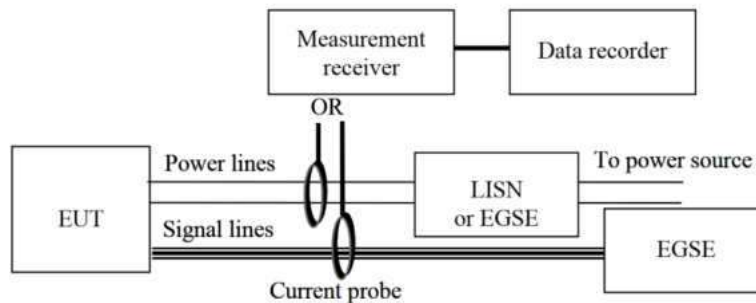
### 7 Measurement of conducted emissions

ECSSEST2007C specifies differential mode conducted emission measurements on power leads in the frequency range of 10 Hz to 150 MHz.

Furthermore, ECSSEST2007C specifies common mode and differential mode conducted emission measurements on power and signal leads in the frequency range of 10 Hz to 150 MHz.



*Conducted emission, differential mode, measurement setup*



*Conducted emission, common mode, measurement setup*

*\*) EGSE: electrical ground support equipment*

Tekbox also provides suitable RF current monitoring probes, such as the TBCP2-30K400.

LISN are also required in other ECSSEST2007C measuring setups:

Radiated emission – electric field; inrush current; conducted susceptibility – signal injection; conducted susceptibility – bulk cable injection; conducted susceptibility – transients; conducted susceptibility – spike series / parallel injection; radiated susceptibility – magnetic field; radiated susceptibility – electric field;

### 8 References

ECSS-E-ST-20-07C Rev. 1

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### 9 Ordering Information

| Part Number  | Description                                                         |
|--------------|---------------------------------------------------------------------|
| TBL0225-2    | 2μH LISN, two path                                                  |
| TBCP2-30K400 | Optional accessory: RF current monitoring probe for CE measurements |

### 10 History

| Version | Date       | Author     | Changes                  |
|---------|------------|------------|--------------------------|
| V1.0    | 31.01.2024 | Mayerhofer | Creation of the document |
|         |            |            |                          |