SLOVENSKI STANDARD
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Aeronavtika - Elektriļ ni kabli za uporabo v zraļ nih plovilih - Preskusne metode - 811. del: Neenakomerno slabljenje

Aerospace series - Cables, electrical, aircraft use - Test methods - Part 811: Unbalance attenuation

Luft- und Raumfahrt - Elektrische Leitungen für Luftfahrtverwendung - Prüfverfahren - Teil 811: Unsymmetriedämpfung

Série aérospatiale - Câbles électriques à usage aéronautique - Méthode d'essai - Partie 811: Affaiblissement de dissymétrie

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Aerospace series - Cables, electrical, aircraft use - Test methods - Part 811: Unbalance attenuation

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 3475-811:2009) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2009, and conflicting national standards shall be withdrawn at the latest by September 2009.

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1 Scope

This standard specifies methods for measuring unbalance attenuation signal in common mode converted into differential mode caused by the characteristics of symmetry of transmission cables. Terms relative to this attenuation are defined in Clause 3.

It shall be used together with EN 3475-100.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

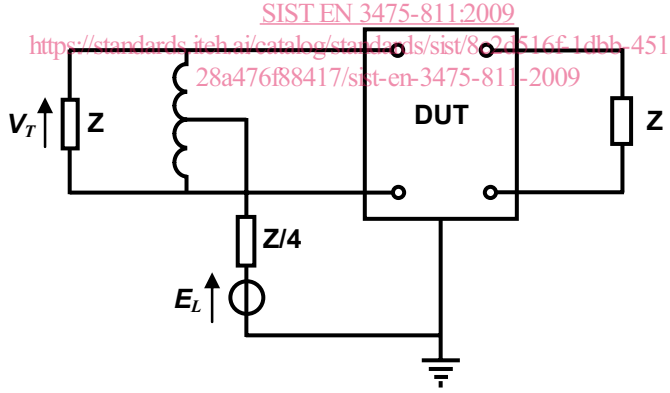
EN 3475-100, *Aerospace series — Cables, electrical, aircraft use — Test methods — Part 100: General.*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
longitudinal conversion loss (LCL)
longitudinal conversion loss is defined as being the logarithmic ratio of the signal injected in common mode at the near end with the resulting differential signal at the near end from a symmetrical pair

The LCL is equal to the attenuation of dissymmetry to the near end when the cable under test is finished with the same impedance that defines for the measurement of the asymmetrical attenuation. (See Figure 1).



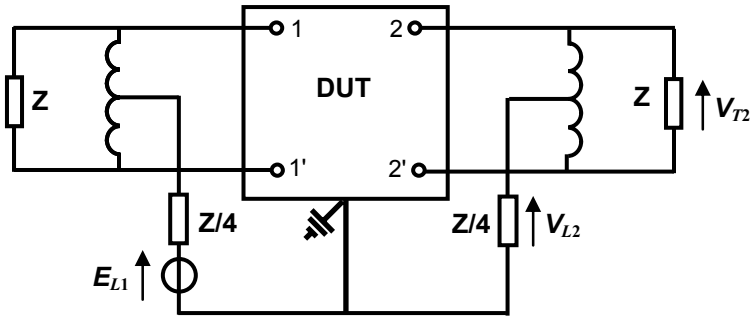
$$\mathbf{LCL} = 20 \log_{10} \left| \frac{E_L}{V_T} \right| \text{ dB}$$

NOTE DUT Device Under Test

Figure 1

3.2
longitudinal conversion transfer loss (LCTL)
longitudinal conversion transfer loss is defined as being the logarithmic ratio of the signal injected in common mode at the near end with the resulting differential signal at the far end distant from a symmetrical pair

The LCTL is equal to the attenuation of dissymmetry at the far end added with the attenuation from the cable under test when this one is terminated with the same impedance that defines for the measurement of the attenuation of dissymmetry. (See Figure 2)



$$\mathbf{LCTL} = 20 \log_{10} \left| \frac{E_{L1}}{V_{T2}} \right| \text{ dB}$$

Figure 2

4 Preparation of specimens

Test specimen shall be of (100 ± 1) metres length.

The ends of the cable under test must be prepared in such way that the assembly of the pairs/quads is maintained.

For unscreened twisted pair cables, it is mandatory to create a defined return common-mode path. This is normally achieved by earthing all other pairs. However, the cable under test may be wound onto a metal drum. In this case the drum, the adjacent pairs and screens, if present, should be earthed.

5 Apparatus

— HF Network Analyser

— Two impedance transformers with centre tap on the secondary windings available (3 ports baluns)

— Coaxial cables

— Different resistors terminations

The baluns should have the following characteristics:

— primary impedance:	50 Ω	unbalanced
— secondary impedance:	100 Ω	balanced
— common-mode port impedance:	high impedance	
— insertion loss:	3 dB	maximum
— return loss secondary:	20 dB	minimum
— return loss, common mode:	10 dB	minimum
— longitudinal balance:	60 dB	minimum
— output signal balance:	50 dB	minimum
— common-mode rejection:	50 dB	minimum

6 Methods

6.1 Calibration

a) For the reference line calibration over the whole specified frequency range the same coaxial cables used for the measurements shall be used by connecting them between the analyser output and the input.

b) Two identical baluns shall be used for the measurements. The baluns shall be connected back to back on the symmetrical output side and their attenuation measured over the specified frequency range. A short length connection shall be used (see Figure 3). The calculated insertion loss is recorded as $Il_{bal,DM}$.

Figure 3

c) The attenuation of the common signals of the test balun is measured by connecting the common-mode port terminals to the differential output terminals of the test balun (see Figure 4). The output terminals of the test balun are short-circuited and connected to the inner conductor of the coaxial test lead. The outer shield of the coaxial test lead should be bonded to the ground plane. The measured insertion loss is recorded as $Il_{bal,CM}$.

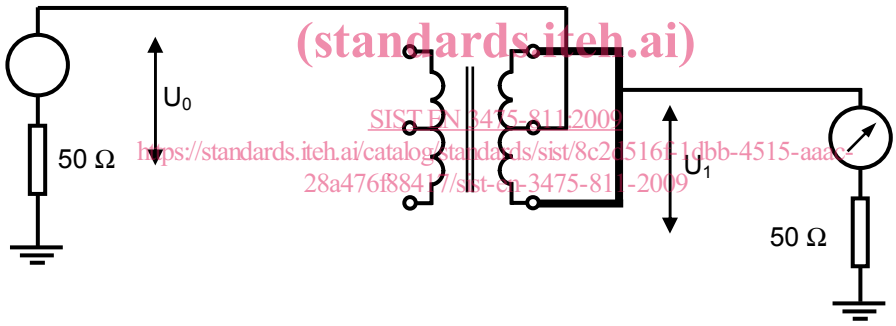


Figure 4

Finally the computing correction is: Cor_LCLcal = 3 dB − $Il_{bal,DM}$ − $Il_{bal,CM}$

6.2 LCL measurement

The DUT pair under test should be connected to the differential mode balun output terminals. All unused pairs should be terminated with the suitable resistors as shown in Figure 5. The loads and the cable shielding should be connected on the same ground plane.