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Transmission properties of cascaded two-ports or quadripols - Background of terms and definitions

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

BACKGROUND OF TERMS AND DEFINITIONS OF CASCADED TWO-PORTS

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IEC 62152, which is a technical report, has been prepared by IEC technical committee 46: Cables, wires, waveguides, r.f. connectors, r.f. and microwave passive components and accessories.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
46/283/DTR	46/300/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This second edition cancels and replaces the first edition published in 2004 and constitutes some technical improvements.

Important terms and definitions have been added.

Some of the terms are better described in the German language and also many countries have originally taken terms and definitions from German and translated them into their own language.

Therefore important terms have been added in German in the form of a footnote.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual edition of this document may be issued at a later date.

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BACKGROUND OF TERMS AND DEFINITIONS OF CASCADED TWO-PORTS

1 Scope

It is important and practical that components of a transmission chain can be separated and tested separately. To accomplish this, well-defined interfaces and measuring techniques, including agreed terms and definitions, are required.

This technical report has two main goals. It lays the foundation for agreement on the fundamental terms and definitions to be used world-wide in describing the transmission properties of a two-port or quadripole. The report builds a bridge between the classical quadripole theory and the scattering matrix presentation which is based on incident and reflecting square root of power waves at the input and output of a two-port. Finally, it is shown that the two concepts are bound together through simple equations and are fundamentally identical.

The quadripole theory was originally developed for voice- and carrier-frequency technologies and transmission, and later for microwaves, but both can be used through the whole frequency range.

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.

IEC 60050-726, *International Electrotechnical Vocabulary – Chapter 726: Transmission lines and waveguides*

IEC 61156-1, *Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification*

IEC/TR 61156-1-2, *Multicore and symmetrical pair/quad cables for digital communications – Part 1-2: Electrical transmission characteristics and test methods of symmetrical pair/quad cables used for digital communications*