

Method of

Expression of the properties of spectrum analyzers

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- International Association of Broadcasting Manufacturers

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National foreword

This British Standard, prepared under the direction of the Electronic Equipment Standards Committee, is identical with IEC Publication 714 “*Expression of the properties of spectrum analyzers*”, published in 1981 by the International Electrotechnical Commission (IEC).

Terminology and conventions. The text of the International Standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards. For the purposes of this British Standard the scope of this standard is contained in clauses 1 and 2.

Cross-references

International Standard	Corresponding British Standard
IEC 351-1:1976	BS 4739 <i>Method of expression of the properties of cathode-ray oscilloscopes</i> Part 1:1979 <i>General</i> (Identical)
IEC 359:1971	BS 4889:1973 <i>Method for specifying the performance of electronic measuring equipment</i> (Technically equivalent)

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 18, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This standard is applicable to instruments known as non-real time spectrum analyzers (hereinafter called “analyzers”). These instruments perform an analysis of the power distribution of a signal by a sampling process such as:

- Swept front end: superheterodyning in which the first local oscillator is swept.
- Swept I.F.: superheterodyning in which other than the first local oscillator is swept.
- Video detector/tunable filter: analysis is accomplished by scanning the input filter across the signal in proportion to the CRT horizontal deflection with the detector output providing the vertical deflection.

Instruments known as real-time analyzers perform a continuous analysis of the incoming signal with the time sequence of events preserved between input and output. This standard is not applicable to those instruments.

2 Object

To lay down uniform methods of expression of the properties of spectrum analyzers and more particularly:

- to define special terminology and catalogue data related to these types of apparatus;
- to specify conditions and methods for testing these types of apparatus in order to verify compliance with properties claimed or specified by the manufacturer.

References

The following publications were utilized in the preparation of this standard:

- IEC Publication 351-1, *Expression of the Properties of Cathode-ray Oscilloscopes — Part 1: General*.
- IEC Publication 359, *Expression of the Functional Performance of Electronic Measuring Equipment*.
- Preliminary report of the IEEE Sub-Committee on spectrum analyzers entitled: IEEE Standard Specification for Spectrum Analyzers.

Section 1. Definitions

The characteristics whose definitions follow consist of two types — main and general ones. Main characteristics are measurable as described in Section 3. They are usually specified. Examples are residual f.m., frequency span, or sensitivity. Additional (general) characteristics such as line spectrum or envelope display are used in technical documentation when required, depending on the purpose of the apparatus.

For terms related to the display, such as “time base” or “single sweep”, refer to IEC Publication 351-1.

3 General terms

3.1

spectrum analyzer

an apparatus which is generally used to display the power/amplitude distribution of an incoming signal as a function of frequency

NOTE Such an apparatus is useful in analyzing the characteristics of repetitive electrical waveforms in general, since by repetitively sweeping through the frequency range of interest it will display all components of the signal. The apparatus is intended to be used for investigating stationary signals, the spectrum of which practically does not change during sequential analysis.

3.2

centre frequency

that frequency which corresponds to the centre of a frequency span, expressed in hertz

3.3

effective frequency range

that range of frequency over which the instrument performance is specified. The lower and upper limits are expressed in hertz

3.4

frequency band

a part of the effective frequency range over which the frequency can be adjusted, expressed in hertz

3.5 Full band span

A mode of operation in which the spectrum analyzer scans an entire frequency band.

3.5.1 multiband span

a mode of operation in which the spectrum analyzer scans more than one frequency band

3.6 zero span

a mode of operation in which the frequency span is reduced to zero

3.7 envelope display

the display produced on a spectrum analyzer when the static or dynamic resolution bandwidth is greater than the spacing of the individual frequency components

3.8 line display

the display produced on a spectrum analyzer when the static or dynamic resolution bandwidth is less than the spacing between the amplitudes of the individual frequency components

3.9 line spectrum

a spectrum composed of signal amplitudes of the discrete frequency components

3.10 Maximum input power

3.10.1 without degradation

the maximum power applied at the input which will not cause degradation of the instrument characteristics

3.10.2 without damage

the maximum power applied at the input which will not damage the instrument

3.11 intermodulation spurious response (or intermodulation distortion)

an unwanted spectrum analyzer response resulting from the mixing of the n th order frequencies, due to non-linear elements of the spectrum analyzer, the resultant unwanted response being displayed

3.12 baseline clipper

a means of changing the relative brightness between the signal and baseline portion of the display

3.13 pulse stretcher

a pulse shaper that produces an output pulse, whose duration is greater than that of the input pulse, and whose amplitude is proportional to that of the peak amplitude of the input pulse

3.14 signal identifier

a means to identify the spectrum of the input signal when spurious responses, generated inside the instrument, are possible

3.15 video filter

a post-detection low-pass filter

3.16 scanning velocity

frequency span divided by sweep time and expressed in hertz per second