



National Standards Authority of Ireland

IRISH STANDARD

I.S. EN 55024:2002

ICS 33.100

**INFORMATION TECHNOLOGY EQUIPMENT -
IMMUNITY CHARACTERISTICS
LIMITS AND METHODS OF MEASUREMENT
(CISPR 24: 1997, MODIFIED)**

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*This Irish Standard was
published under the
authority of the National
Standards Authority of
Ireland
and comes into effect on
December 13, 2002*

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I.S. EN 55024/IS1:2007

ICS

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- IMMUNITY CHARACTERISTICS - LIMITS
AND METHODS OF MEASUREMENT**

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EN 55024/IS1

Interpretation Sheet 1

EN 55024:1998

English version

Foreword

This Interpretation Sheet to the European Standard EN 55024:1998 + A1:2001 + A2:2003 was prepared by the Interpretation Panel of the Technical Committee CENELEC TC 210, Electromagnetic compatibility (EMC). The text of the draft was submitted to the Unique Acceptance Procedure (as prISA to prISE) and was approved by CENELEC on 2007-06-22.

Annex A Telecommunications terminal equipment

Application of Annex A to personal computers used as TTE.

PCs are multi-function equipment by nature. EN 55024 requires the testing of all functions of multi-function equipment in order to establish compliance. Modern PCs have the capability of being used as VoIP or video TTE.

Question 1:

How should the testing be performed when PCs are used in this mode ?

Interpretation 1:

As the standard modern PC will support VoIP and video conferencing, it has several functions as TTE in addition to its functions as self-contained ITE. Compliance with EN 55024 is dependent on all functions of a product being compliant.

The interpretations given for questions 4 and 5 on the testing of VoIP telephony products and video conferencing systems to EN 55024 can equally be applied to these functions of PCs.

Clause A.1 Telecommunications terminal equipment (TTE) having an analogue interface
Clause A.2 Telecommunications terminal equipment (TTE) having a digital interface

Dealing with echo-cancelling within TTE products.

Question 2:

The requirements for acoustic and line noise measurements assume that the emitted tone and the line noise signal are at a constant level over time. In practice echo-cancelling functions have been observed to recognise a 1 kHz audio tone as an echo and hence attenuate it, sometimes with several stages of attenuation. Should echo-cancelling be turned off? If not, what is timing of the measurements from the application of the AM to the CW?

Interpretation 2:

Where echo-cancelling is employed, turning it off may not always be possible. Echo-cancelling would potentially provide a benefit the TTE in real-life performance by attenuating any demodulated noise. As generally stated in EMC performance criteria the compliance of the EUT must be assessed when “operated as intended”. Also, Article 4 (b) of 89/336/EEC states that apparatus shall be so constructed that “the apparatus has an adequate level of intrinsic immunity to electromagnetic disturbance to enable it to operate as intended.”

For these reasons, echo-cancelling functions shall not be turned off during testing. (Due consideration has been given to similar standards, such as ETSI 301 489-7, where there is a requirement to turn off echo-cancelling prior to testing, but it is considered that for apparatus covered by EN 55024, this is not appropriate.)

Reference levels shall be established before the echo-cancelling function operates. If this is difficult to observe due to the speed of the echo-cancellation, then acoustic measurement equipment shall be set to record the maximum acoustic level from the instant of the -40 dBm/dBm0 injection on the line.

Good echo-cancelling attenuates a demodulated signal rapidly, and is desirable. Echo-cancelling that takes some time to become effective would cause annoyance. The dwell time typically used for 1 % steps at a sweep rate of $1,5 \times 10^{-3}$ decades/second is approximately 3 s, and this offers a practical solution for determining the appropriate time of measurement.

Therefore in order to assess the effectiveness of the echo-cancelling and to establish compliance, the dwell time (i.e. the time during which the carrier frequency is amplitude modulated with 1 kHz prior to measurement) shall be 3 s. The end of the dwell time indicates the start time of the demodulation measurements (in both directions). The amplitude modulation shall remain on during the demodulation measurements.

Test laboratories are encouraged to ensure the time taken to make the demodulation measurements is as short as possible (less than one second) and they shall record and report the time taken for the measurements. The total dwell at each test frequency is therefore 3 s plus the demodulation measurement time.

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