WELMEC 2.5
(Issue 2)

WELMEC

European cooperation in legal metrology

Guide for modular approach and testing of PCs and other digital peripheral devices (Non-automatic Weighing Instruments)

September 2000

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WELMEC is a cooperation between the legal metrology authorities of the Member States of the European Union and EFTA. This document is one of a number of Guides published by WELMEC to provide guidance to manufacturers of measuring instruments and to notified bodies responsible for conformity assessment of their products. The Guides are purely advisory and do not themselves impose any restrictions or additional technical requirements beyond those contained in relevant EC Directives. Alternative approaches may be acceptable, but the guidance provided in this document represents the considered view of WELMEC as to the best practice to be followed.

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**Guide for modular approach and
testing of PCs and digital peripheral devices
(NAWI)**

1 INTRODUCTION

General considerations

The European Standard on NAWI: EN 45501 contains the metrological and technical requirements for NAWI subject to legal metrological control that provide presumption of conformity to the essential requirements of Directive 90/384/EEC.

EN 45501, which is identical to the OIML recommendation R76 in content, has introduced the concept of modular approach. Subject to agreement between the manufacturer and the notified body for EC type examination, modules may be defined and examined separately (see 8.1 of EN 45501).

The general principle for combining the contribution of each of the modules to the error of the complete instrument and the limiting values for a module's contribution are presented in 3.5.4 of EN 45501 which also gives an acceptable solution with the example of a classical combination of modules already well experienced at the time of the preparation of OIML R76 and EN 45501.

Furthermore WELMEC WG2 has already produced two guides concerning modules which were not covered in detail by EN 45501 or any OIML recommendation: indicator and POS device.

A problem with the modular approach identified by WELMEC is that there is now a need to treat in a harmonised way other types of construction where different technologies are involved.

More and more modules and devices are digital devices and some devices can be regarded as modules or peripheral equipment. Many modules and peripherals available from the market or already covered by a test certificate, or listed in a type approval certificate delivered by a notified body, are quite different from the examples presented by EN 45501. In some cases there is also a need for general acceptance of some types of modules or peripherals in the wording of a type approval certificate.

This guide is intended to provide notified bodies with general principles and some already accepted solutions.

Scope

This guide is a general guide on modular approach for NAWI which will be a basis for all other guides on modules and peripherals of NAWIs. Specific guides, like the already existing 2.1, 2.2, 2.3 and 2.4 WELMEC documents give more details on requirements and tests applying to specific modules. This guide also treats the simple cases for which it was not considered necessary to develop a complete specific guide.

This guide is based on the EN 45501 standard, but in this guide and in other WELMEC guides some possible addition or deviation generally accepted by members of WELMEC could also be presented.

This guide was developed for and applies to non-automatic weighing instruments but could serve as a basis for further discussion for other instruments. It has therefore been drafted to be coherent with the general document WELMEC 7.

2   DEFINITIONS

The following definitions apply to this guide but also to other WELMEC guides concerning NAWIs.

Note: for a better understanding of the definitions below, refer to the drawing in Annex 1.

2.1   Module

As mentioned in the opening section "General considerations", the term module is introduced in 8.1 of EN 45501 with respect to the application for type examination. According to the terminology (T.2.2) of EN 45501 a module is a part of the instrument which performs a specific function, it can be tested separately and it is subject to specified partial error limits. On the basis of this terminology the following specified definition has been developed by WELMEC.

A **module** is a part of the NAWI that is necessary for obtaining the weighing result and any primary indication related to it[1]. A module is capable of being tested separately and of having partial error limits p_i assigned to it. (See requirements concerning p_i in Section 3.2 of this guide.)

A device connected to a NAWI via a non-protective interface is regarded as a module. The connection needs to be secured and if nothing is connected to it the interface itself needs to be secured.

Examples of modules of a NAWI: load cell, indicator, display, price-computing POS device, software, "weighing module" (here we mean "digitally working instrument including mechanical structures but without display" which is therefore not a NAWI).

2.2   Peripheral

A peripheral is an additional device to the NAWI, connected externally or built in, which repeats or further processes the weighing result and/or any primary indication without changing the original characteristics as specified in the TAC (see 2.7 below) of the NAWI.

A peripheral shall be connected to the instrument via a protective interface (see 2.3 below).

Examples of peripherals of a NAWI: printers, supplementary display, alibi printer, alibi data storage device, personal computer (PC), non-price-computing POS device which receives all primary indications from the NAWI and only prints them on a ticket.

2.3   Interface

Section 5.3.6 of EN 45501 deals with interfaces. The adjective "protective" has been used by notified bodies and manufacturers to describe an interface which is in conformity with 5.3.6.1 only and sometimes in conformity with both 5.3.6.1 and 5.3.6.3.

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[1] See definition of primary indication in T1.3.1 and Section 4.14 and 4.15 of EN 45501.

In fact, EN 45501 describes two types of protection and the combination of the two is possible:

- protection detailed in Section 5.3.6.1 of EN 45501: the interface prevents introduction into the instrument of unauthorised data, parameters and instructions

- protection according to Section 5.3.6.3 of EN 45501 which covers the manner data related to primary indications are transmitted to a peripheral device under legal control.

The drawing in Annex 1 of this guide shows where interfaces are in conformity with both 5.3.6.1 and 5.6.3.3 or in conformity with 5.3.6.1 only.

2.4 Non-automatic weighing instrument (NAWI)

In addition to the definition T.1.1 of EN 45501 the following definition applies:

A NAWI consists of all the modules necessary for obtaining the weighing result and any primary indication related to it.

2.5 Weighing system under legal control

The modules and <u>some</u> peripherals together make the **weighing system under legal control** which can also be connected to other peripherals not subject to the essential requirements[2] and bearing the red label[3].

2.6 Weighing system

The NAWI and <u>all</u> peripheral devices make the **weighing system**.

2.7 Type approval certificate (TAC)

A **TAC** specifies the modules and peripherals that the legally controlled weighing system comprises. It states the characteristics of the NAWI and the peripherals foreseen according to the essential requirements of Directive 90/384/CEE.

Note: The characteristics according to the essential requirements include the type of instrument, see the 3 categories defined below. A positive statement in the TAC states if the instrument was examined according to the specific essential requirements Nos. 14 and 15 of Directive 90/384 (direct sales to the public and price labelling instrument).

A TAC may make reference to test certificates (TC) and test report (TR) and state under which conditions peripherals with a TC or TR may be connected to the NAWI or modules with a TC or TR may be chosen or exchanged.

Devices with a TR are not eligible for general acceptance which is possible for devices with a TC.

A statement in a TAC may also allow[4] the connection of any peripheral having passed examination according to WELMEC 2 issue 2 para 3.2. (See details in 3.3 of this document.)

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[2] For the extent of the legal control refer to requirements for submission to essential requirements and 3.1 of this guide
[3] Directive 90/384 Art 12 and Annex IV
[4] See WELMEC 2 issue 2 page 7 para 3.2 last sentence

2.8 Test Certificate (TC)

TCs are tools to facilitate the type examination work. They deal with modules of, or peripherals to, a NAWI. In order to receive a TC, modules and peripherals must be in conformity not only with the essential requirements of Directive 90/384 but with the specific requirements contained in EN 45501 and the applicable WELMEC guides as a means of harmonised interpretation of existing regulations.

TCs are tools to allow, under the wording of a TAC, to connect a peripheral to a NAWI or to include a module in a NAWI.

In order to avoid legal problems the owner of a TC must clearly state his agreement that the TC number can be quoted in a TAC. The ownership of a TC is the property of the applicant.

2.9 Test Report (TR)

For modules or peripherals which do not comply fully with EN 45501 and the applicable WELMEC guides but were tested and examined according to the essential requirements Test Reports **(TR)** may be issued to facilitate work on TACs.

Devices with a TR are however not eligible for general acceptance which is possible for peripheral/modules with a TC.

The TR shall describe the solution (different from EN 45501 and WELMEC guide but accepted by the notified body under its own responsibility) adopted to fulfil the essential requirements.

In order to avoid legal problems, the owner of a TR must clearly state his agreement that the TR can be used by a manufacturer of NAWIs and a notified body for type examination. The ownership of a TR is the property of the applicant.

2.10 Categories of instruments according to essential requirements

In practice the essential requirements define 3 basic types of NAWIs (and any combination of these types). These 3 types are:

category 1:   instruments used for legal use except direct sales to the public and price labelling

category 2:   instruments used for direct sales to the public (extra requirement in 14 of Annex 1 of Directive 90/384 and last sentence of Preliminary Observation).

category 3:   price labelling instrument (extra essential requirement in 15 of Annex 1 of Directive 90/384).

3 GENERAL PRINCIPLES

3.1 Submission to essential requirements

NAWIs[5] are subject to the essential requirements of Annex 1 of Directive 90/384/CEE.

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[5] For Article 1.2a uses mentioned in Directive 90/384

Following essential requirement 8.1, a NAWI must have a display since, according to the terminology used for essential requirements of Directive 90/384, the verb "indicated" covers only display (see 1st sentence of Annex 1 of Directive 90/384 and OIML R76 Note in T.1.2).

Directive 90/384 states in the Preliminary Observation to Annex 1 that normally the whole of the non-automatic weighing instrument and its peripherals used for "Art. 1.2.a uses" (thus the weighing system[6]) is subject to the essential requirements. Only if an alibi printer (APR) or a data storage device (DSD) that meet the essential requirements is used, peripherals that repeat the result are not subject to the essential requirements - with the exception of direct sales to the public where all displays and printers for the vendor and the customer must fulfil the essential requirements.

Comment: the use of an alibi recording device (printer or storage) makes sense only if the weighing result used for the transaction is printed or recorded together with an identification (see 6.4 of this guide). The identification gives the possibility to the client of the transaction or to a third party involved in the result) to check the correctness of weighing data in case of doubt. On the other hand, weighing results which are not used for transactions need not be stored or recorded in the alibi recording device. If the alibi recording device ceases to operate, then the weighing system should either cease to operate or alert the operator.

See examples of application of Preliminary Observation of Annex 1 of Directive 90/384 in Annex 4 of this guide.

3.2 Apportioning of errors and compatibility

According to EN 45501, p_i is limited from 0.3 to 0.8 for the module which contributes to the error.

For fully digital devices it is now admitted p_i may be equal to 0.

For a weighing module which includes all mechanical parts and performs all relevant functions of a NAWI except display it may be equal to 1.

See examples in Annex 2 of this guide.

The compatibility of modules shall be established and declared by the manufacturer. For indicators and load cells this can be done by using the compatibility form proposed in WELMEC 2 (issue 2) July 1996 chapter 11.

3.3 Tests and examinations

An additional hardware device performing functions of a peripheral but being incorporated in the same housing as the NAWI or one of its modules, shall be tested together with the instrument or the module. Here it is meant that when such a construction occurs there is no reason to separate the device and submit it to fewer tests than the rest of the instrument or module.

[7]Devices (modules with $p_i = 0$ or peripherals) that operate purely digitally such as printers, additional display, additional keyboard, data storage device or terminals need not be tested for temperature variations (EN 45501 No. A.5.3 and B.2.2) and for span stability (EN 45501 No. B.4). They shall once be connected to, or be part of, a NAWI and tested for correct functioning.

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[6] See 2.6 of this guide
[7] This paragraph and the next one have been copied from WELMEC 2 issue 2 paragraph 3.2

Unless conformity to the EMC Directive is already established to at least the same level of requirements as in EN 45501 they shall also be tested for immunity to disturbances.

Simple recipient devices that:

-       bear the CE marking of conformity to the EMC Directive 89/336/EEC

-       are not capable of transmitting any data or instructions into the NAWI other than to release a printout or to check for correct data transmission, and

-       print or indicate weighing results and other data as received from the NAWI without any modification or further processing

-       comply with the applicable requirements of EN 45501 ie 4.2, 4.4, 4.5, 4.6 and 4.7

may be connected to a NAWI which transmits data in accordance with 5.3.6.3 of EN 45501 without a test certificate or statement in an EC type approval certificate having been issued. A printing device may print additional information as date or number to identify the printed weighing result(s) or sets of weighing results.

For weighing modules, a TC may be granted provided that they have been examined and tested (with $p_i = 1$) in accordance with EN 45501, as far as applicable, and with the respective WELMEC guides (WELMEC 2.1 for indicators, load cell guide, Section 4.2 of this guide), as far as applicable.

The software for free programmable modules or peripherals shall be examined according to WELMEC 2.3.

3.4   Securing

A peripheral is always connected to the instrument via a protective interface.   (See Section 2.3 of this guide.)

Connection between modules may be "non-protective". In this case the securing device of the complete instrument will prevent action of the user on this connection.

3.5   Documents

NAWIs or weighing systems respectively must have a TAC. "Modules" and "peripherals" may have a TC in order to ease the type-examination of the instrument or shall have a TC if stated in the TAC of the instrument.

When the modular approach is used but without reference to TCs, the TAC shall contain all the information that would be in the TCs.

Note: the module "load cell" may also be granted an OIML certificate or conformity to R60 by a notified body for EC type examination, provided that the respective WELMEC guides are followed.

If a device can only be used as a peripheral, it shall be stated in the test certificate. When nothing is stated, then this device could be either a module or a peripheral.

Modules may have a TR to ease type examination. The decision to accept a TR for EC type examination remains with the notified body.

3.6   Marking

The marking of a NAWI is defined in Annex IV of Directive 90/384. Concerning the marking of a module or a peripheral the requirements of Annex IV of Directive 90/384 are "... when applicable: - for instruments consisting of separate but associated units: identification mark on each unit" and "... when applicable: - ratio between load receptor and load".

The marking of the module or the peripheral with its relevant TC number is the preferred way of identification. It will be clearly stated in TCs but this requirement is not retrospective. Another way of identification could be defined in the TAC (for example table of identified combinations of modules).

3.7   Identification of software on EPROM

Concerning modules, where test certificates are involved there is a need for identifying software stored on EPROM. The identification shall comprise the legally relevant program parts and parameter (see WELMEC guide 2.3; paragraph 3). The identification shall be capable of being confirmed at verification. It can be displayed or printed automatically at switch-on or on manual command or be accessible by any other means provided that the identification itself, and the procedure how to access it is detailed in the TC.

The manufacturer is free to choose the manner of identification (eg a functional checksum; kind of version number) but he shall agree with the notified body on the legally relevant parts of the software covered by the identification. Modifications to the legally relevant software which influence the conformity with the approved type require a change of the software identification. This must receive additional approval in the form of an addition to the original TC or a new TC shall be issued.

Considering the problems involved in price calculation by the differences in monetary units and the different methods of rounding, it is admitted that corresponding data could be considered as device-specific parameters.

See WELMEC 2.3 for identification of software for free programmable NAWIs or modules.

3.8   General acceptance in TAC

Modern weighing systems often have a modular structure. In order to offer both the notified bodies and the manufacturers more flexibility and to avoid multiple additions to TACs, a concept of general acceptance in TAC has been developed. This route is not mandatory; there is always the possibility for a manufacturer to follow the classical route with only one combination of modules, or several combinations with limited acceptance of defined modules.

Modules are covered by limited acceptance when they are listed in the TAC (with sometimes mechanical conditions) and covered by "general acceptance" when there is a statement in the TAC saying that "any module of a certain type fulfilling some conditions" may equip the instrument.

If the general acceptance route is followed, the TAC shall contain the respective statements and conditions which are laid down in the WELMEC documents.

There are cases where, under certain conditions, "General acceptance in TAC" is already used (mainly printers).

General acceptance will be applicable for load cells (see draft guide on load cells) and is already applicable for POS devices see guide WELMEC 2.2).

Concerning the indicator module, TCs for indicators should be specifically referred to in a TAC as it is the indicator which defines the exact type of the weighing instrument (without this constraint the TAC would become a general statement where any possible option is permitted).

4   GUIDANCE FOR PRINTERS

4.1   Simple recipient printer

A simple recipient printer is a printer that is not capable of transmitting any data or instructions into the NAWI other than to release a printout or to check for correct data transmission, and prints weighing results and other data as received from the NAWI without any modification or further processing.

For tests and examination of simple recipient printers refer to Section 3.3 of this guide.

4.2   Other printers (not "simple recipient")

For printers that are not "simple recipient" the guidance is:

-        the form of the test certificate is identical to the one used in the existing guides

-        documentation (identical to list on page 4 of WELMEC guide 2.2)

-        tests: only disturbances tests (B.3.1 to B.3.4) and voltage variations (A.5.4), connected to a NAWI (if already CE marked because of EMC Directive, criteria of acceptance to be asked to check if they are compatible with the ones of EN 45501)

-        examination: relevant part of the checklist R76-2

-        if it is free programmable refer to WELMEC guide 2.3.

Note: Both simple recipient and other printers, can be used as alibi printers (see Section 3.1 of this guide) provided that they meet the applicable requirements. Points 6.2, 6.3 and 6.4 of this guide concerning guidance about DSD apply also to printers (simple recipient or not) as an interpretation of the essential requirement "printed correctly" for Alibi printer (Preliminary Observation and 10 in Annex 1 of Directive 90/384).

5   GUIDANCE FOR PCs

5.1   PCs as peripheral

For purely digital PCs used as purely digital peripheral devices, the CE marking (without the green label with M) corresponding to conformity to EMC Directive is sufficient. No special EMC test according to EN 45501 (A.5.4, B.3.1 to B.3.4) is required. See Section 3.3 of this guide.

5.2   PCs as modules

PCs incorporating an A/D board or the relevant analogue electronics shall be treated according to guide WELMEC 2.1, all tests specified in EN 45501 including the temperature, humidity and span stability have to be conducted.

PCs acting as the digital part of an indicator shall be submitted to all tests according to guide WELMEC 2.1, except temperature, humidity and span stability. (Note: this will be introduced in the next revision of WELMEC 2.1.)

PCs performing the functions of a POS shall be treated according to guide WELMEC 2.2.

One complete test of one pattern of a PC is sufficient to assume the conformity of other PCs bearing the CE marking and having the same power supply, same type of interfaces, same mother board, same housing.

In all cases the TC of a PC must contain information about the relevant hardware and software used for the tests.

In all cases the software of a PC is regarded as a module of the weighing system under legal control which has to be examined according to document WELMEC 2.3.

Documentation to be submitted: power supply, type of interfaces, mother board, housing, A/D converter.

Further guidance on the testing and documentation required for a PC as an indicator is given in Annex 6 of WELMEC 2.1 (Issue 3).

6   GUIDANCE FOR DATA STORAGE DEVICE (DSD)

See comment about Preliminary Observation of Annex 1 of Directive 90/384 in Section 3.1 of this guide.

The following **requirements** apply to data storage devices (DSD) subject to legal control.

Note: For direct sales to the public, display and printing devices for the vendor and the customer must fulfil the essential requirements of Directive 90/384, even if there is an approved DSD.

6.1   The DSD must have a storage capacity which is sufficient for the intended purpose

Note: The regulation concerning the minimum duration for keeping information is outside the requirements concerning instruments and probably left to national rules concerning trade. It is the responsibility of the owner of the instrument to have an instrument that has sufficient capacity of storage to fulfil the requirements applicable to his activity. The notified body for EC type examination will only check that the data are stored correctly and given back correctly and the possibility of extension of capacity.

A wording in the TC or TAC shall state that the capacity of storage will be adapted to national requirements and the needs of the user.

6.2   The data stored must contain all relevant information necessary to reconstruct an earlier weighing

Note: Relevant information is: gross or net values and tare values (if applicable, together with a distinction of tare and preset tare), the decimal signs, the units (eg kg may be encoded), the identification of the data set (see 6.4), the designation and/or the number of the NAWI or load receptor (only if several NAWIs or load receptors are connected to the DSD) and the signature (if applicable, see 6.3 2nd paragraph). In the following these data are designated as "relevant data".

6.3   The data stored must be protected against unintentional and intentional changes with common software tools

Note: For the definition of common software tools refer to terminology of guide WELMEC 2.3.

Acceptable solutions

When the data are stored in a memory device within the NAWI, a simple parity check is sufficient in order to protect the data against unintentional changes during transmission to or from the DSD.

The DSD may be realised as a software module using the (user-accessible) hard disk of a PC as the storage medium. In this case the respective software module is part of the software subject to legal control which must fulfil the software requirements of WELMEC 2.3. The stored data have then to be encrypted or to be secured by a signature (at least 2 bytes, eg a CRC-16 checksum with hidden polynomial) in order to protect them against intentional changes with common software tools (eg text editors). If a checksum or other protection is chosen for the protection it shall be stored together with the other relevant information for the respective data set as mentioned under Section 6.2.

For the protection of data against unintentional changes during transmission to or from the DSD a simple parity check is sufficient.

6.4   The data stored according to Section 6.2 must be capable of being identified and displayed; the identification must be recorded on the official transaction medium ("delivery note") ([8]) for the "customer". In case of a printout the identification shall be printed

Acceptable solution

The identification may be realised as consecutive numbers (eg the delivery note number) or as the respective date and time (mm:dd, hh:mm:ss).

If the "delivery note" contains one identification for several data sets, this overall identification is sufficient for the respective data sets.

6.5   The relevant data according to Section 6.2, which are used for a 1.2a) use, must be stored automatically

Note: This requirement means that the storing function must not depend on the decision of the operating person. Nevertheless the automatic storing needs a first decision of the user which is to accept the result of the weighing as a value for a 1.2a) use, for example by ordering a printing or another command. In other words there might be some intermediate weighings (for example during loading or before the wanted quantity of product is on the load receptor) that will not be stored.

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[8] Here we mean the note coming from the "red M" printer which is nevertheless allowed to be used for the transaction (or any 1.2a use except direct selling) on the condition that there is a DSD

6.6   Stored data sets which are to be verified by means of the identification must be displayed or printed on a device subject to legal control

Note: The software parts of the system which realise the display or printing function shall also check for intentional changes of the stored data. These parts form part of the legally relevant software (see WELMEC 2.3).

ANNEX 1
WEIGHING SYSTEM
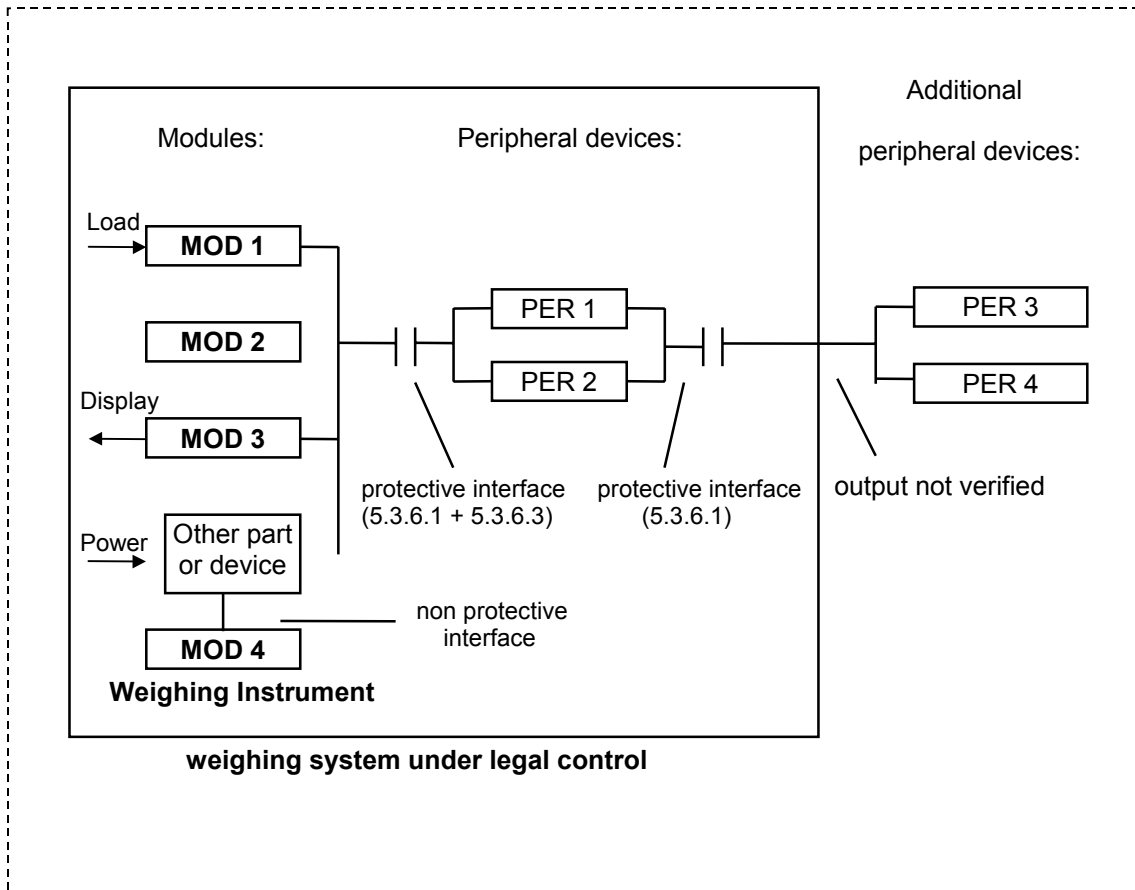
weighing system

ANNEX 2
EXAMPLES OF COMBINATIONS OF MODULES
(different from the acceptable solution already mentioned in EN 45501)

Example 1

module 1 = weighing module (including complete mechanical structure, load measuring, electronics including A/D conversion and digital data processing)

module 2 = purely digital display either simple recipient or with operating terminal but without further processing

In this case it is admitted that the whole contribution to the mpe is coming from module 1.

Module 2 has a $p_i = 0$ must be connected once to a weighing module to be tested for disturbances and correct exchange of data with module 1. Module 2 can also be used as a peripheral that repeats the result in other cases.

Example 2

module 1 = load receptor (same as in EN 45501) $p_i = 0.5$

module 2 = load cell (R60) $p_i = 0.7$

module 3 = processing unit (A/D converter included) p_i like in indicator guide ($p_i \leq 0.5$)

module 4 = display (purely digital without any treatment) $p_i = 0$

Example 3

module 1 = (load receptor + load cell) $p_i = 0.8$

module 2 = processing unit (A/D converter included) p_i like in indicator guide ($p_i \leq 0.6$)

module 3 = display (purely digital without any further processing) $p_i = 0$

Example 4

module 1 = load receptor (same as in EN 45501) ($p_i = 0.5$)

module 2 = digital processing unit with display $p_i = 0$

several identical modules ie load cells with digital output (total p_i) = 0.8*

*only in the case where the load cell transmits adjusted weight signals. (When a digital load cell transmits only counts and a further treatment is done by another part the classical value of 0.7)

Example 5

load receptor	$p_i = 0.5$
load cell	$p_i = 0.7$
PC hardware	$p_i = 0.0$
A/D board	$p_i = 0.5$
software	$p_i = 0.0$

ANNEX 3
CATEGORIES OF NAWI

Category 1

Examples

1)   NAWI with no interface (so with no peripheral)

2)   NAWI with interfaces. As soon as this NAWI has interfaces, 2 cases are possible:

> **2a)**   One connected peripheral is an **"alibi" printer** or a **data storage device** which shall be in conformity with the essential requirements (see Annex 1: Preliminary Observation).
>
> Other devices between the instrument and this "alibi or storage" device are submitted to the essential requirements except in the case where the legally relevant data are transmitted in an encrypted form from the NAWI to the alibi or storage device. In such a case the instrument has to be fitted with an encryption facility and the "alibi for storage" device has to be fitted with a decryption facility which are also submitted to the essential requirements. All the other connected devices may or may not be in conformity with the essential requirements.
>
> **Note**: In practice it would be hard to determine which are the devices in between, especially if the instrument is connected to a network and uses a network printer for the printout. In this case the NAWI should send the data files with a CRC over the complete file. The instrument that receives the data files and checks the CRC and prints out the files needs to have a TC and is considered part of the NAWI. (Of course it eliminates the use of simple recipient printers as a network printer because the printer has to have the ability to check the CRC unless the printer uses a CRC decoder chip.)
>
> **Note**: Requirements concerning traceability of the weighing data on the invoice sent to the customer. More and more companies send an invoice to their customer and offer the opportunity to see the result on the data storage device or on the alibi printer only if these customers complain about the invoice. If no traceability is achieved between the data on the data storage or on the ticket coming from the alibi printer and the invoice, the keeping of data on the data storage or from the alibi printer is meaningless. (See requirement in 5.4.)
>
> **2b**)   If no "alibi" printer or a data storage device is available, all the connected devices have to be in conformity with the essential requirements ("other peripherals").

Category 2

For category 2 all printers and displays for vendor and customer plus everything between the instrument and these devices are submitted to the essential requirements.
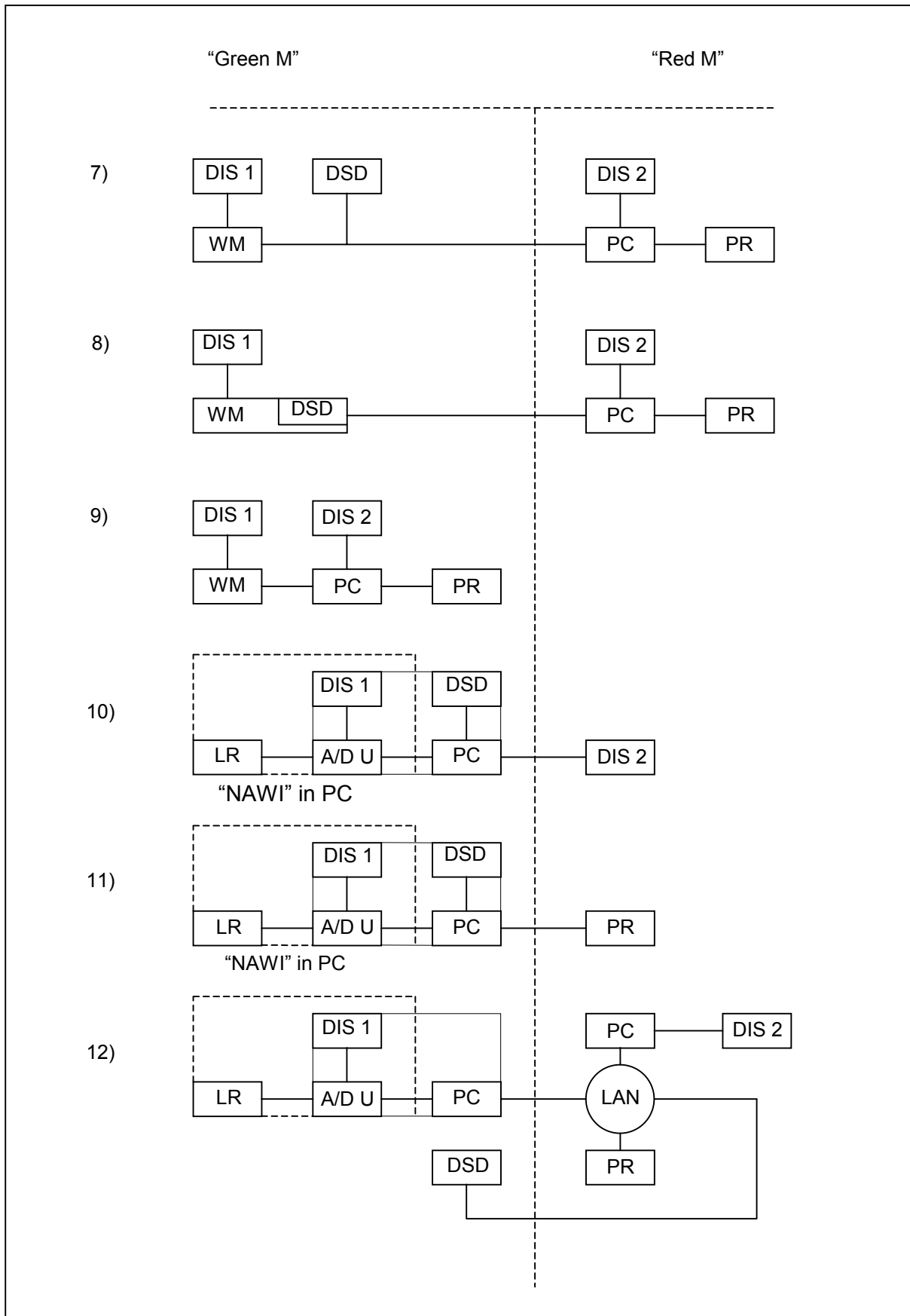
Category 3

For category 3, by definition there is a printer (see Terminology of R76 and EN 45501). The supplementary essential requirements are in 15 of Annex 1 of Directive 90/384 with an explanation in 4.17 of EN 45501.

"Green M"   "Red M"

7)

8)

9)

10)   "NAWI" in PC

11)   "NAWI" in PC

12)
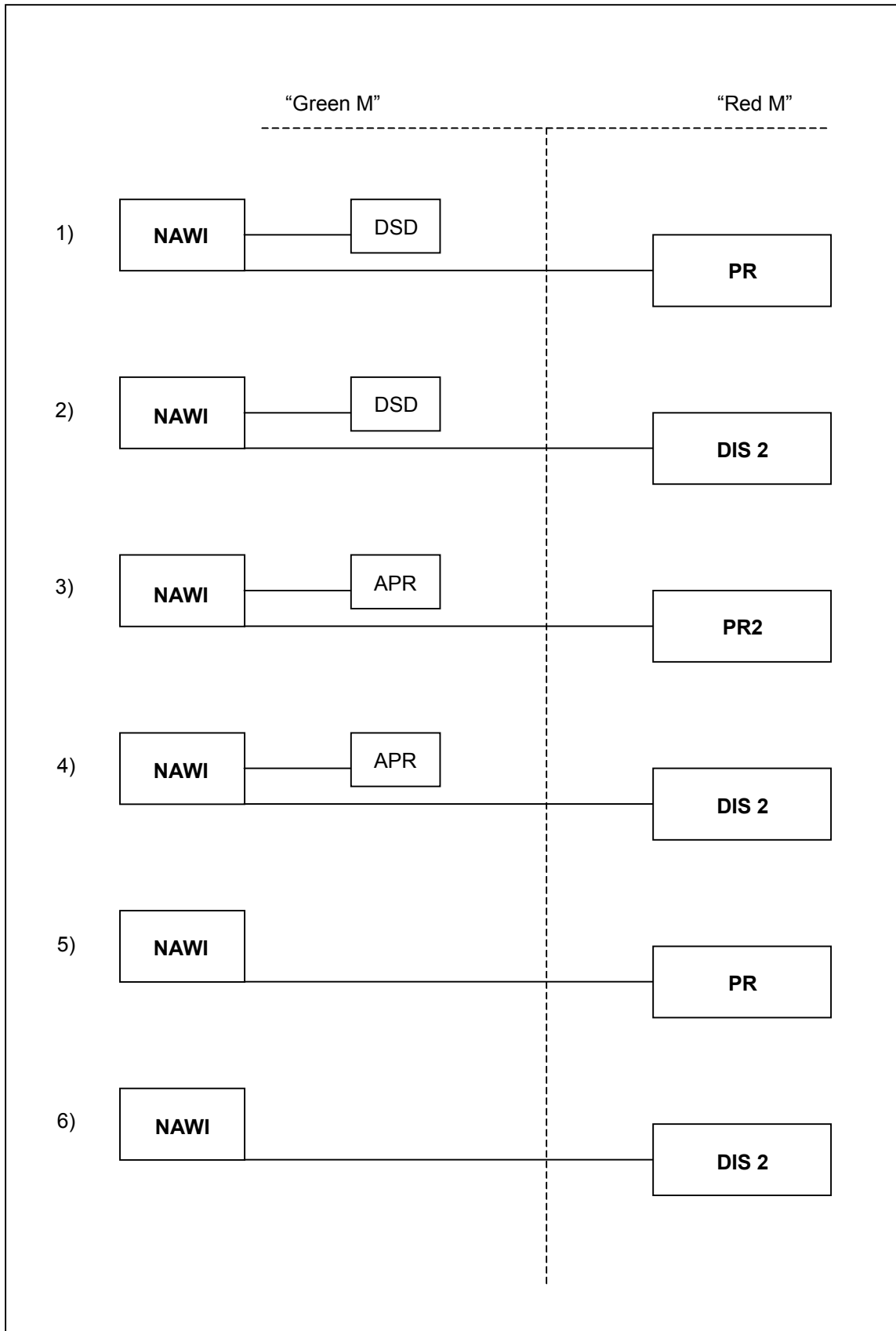
Meaning of the abbreviations used:

"Green M"   conformity to essential requirements of Directive 90/384

"Red M"   no conformity to the essential requirements of Directive 90/384 (see Art 12 of Directive 90/384)

DSD   data storage device
APR   alibi printer
PR   printer
DIS   display
DIS 1   first display (when not mentioned it is included in the NAWI)
DIS 2   simple second display repeating the indications (the first one being included in the NAWI)
WM   weighing module
A/D U   analog to digital unit
LR   load receptor (when not mentioned it is included in the NAWI)
LAN   local area network

Note: the following does not apply to direct sales to the public where printer or displays for the vendor and the customer shall all be in the "green M" part.

Possibility of legal use of indications

In examples 1, 2, 3, 4, 7, 8, 10, 11 the presence of an alibi device in the part "green M" allows indications coming from the "red M" peripherals for 1.2 a uses*.

In examples 5 and 6 there is no alibi device so indications coming from the "red M" peripherals are not legal for 1.2a uses.

In example 9 all indications are coming from the "green M" and are therefore legal for 1.2a uses.

In example 12, if the data are secured or encrypted when going through the LAN in addition to the presence of a "green M" DSD then the indications coming from "red M" peripherals are legal for 1.2a uses*.

*with the exception of direct sales to the public (see Note above).