



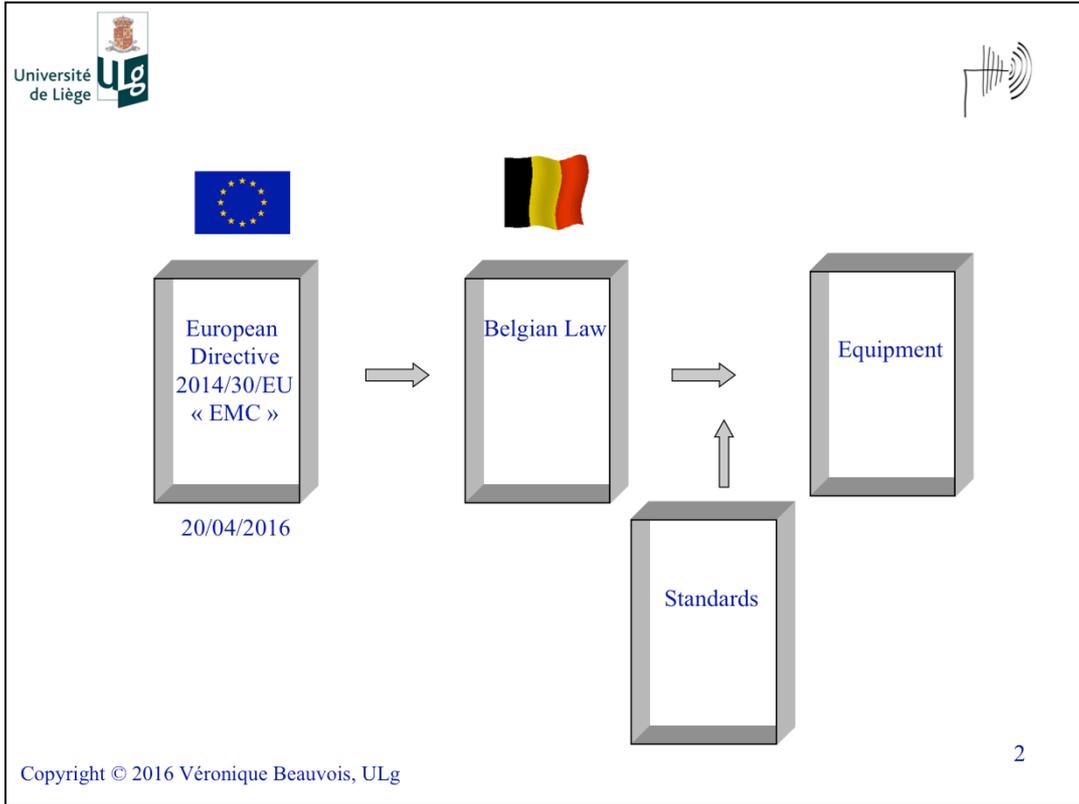
# EMC Directive 2014/30/EU

Véronique Beauvois, Ir.  
2016-2017

This second part of the lesson & is dedicated to EMC legal aspect and standards.

We should begin by a first part on the last version of the European directive 2014/30/UE which concerns electronic products to put on the European market.

This directive is very recent, she is mandatory in Member States since April 20, 2016.



A European directive has no force on law in a Member State, and should be transposed in each national legislation, in Belgian law e.g.

In principle the transposed national version is very similar to the directive.

For information, the directive is not transposed in Belgian law at this date (August 5, 2016).

As we have seen in the introduction, the directive is quite vague and contains no technical information. So the importance of European standards is critical to demonstrate conformity of products.

## Directive 2014/30/EU Objectives



- Good functioning of the internal market
- **Free movement** of goods
  
- Electromagnetic environment *with a adequate level*
  - adequate protection of radio communication
  - adequate protection of telecommunication networks
  
- Not related to safety

The main objectives of this directive are the good functioning of the European market, and the free circulation of goods.

This directive aims for an electromagnetic environment with a adequate level to protect the good functioning of radio communication and telecommunication networks.

This directive is not related to safety of products (even if some interferences could make dangerous some appliances).

## Directive 2014/30/EU



### • Scope

#### equipment is:

#### • apparatus

- electrical or electronic apparatus
- component (for the integration by the end-user  
e.g. a CD-ROM drive)



- fixed installation: particular combination of several types of apparatus assembled, installed and intended to be used permanently at a fixed location.



- large machines
- networks (power plant, telecommunication)



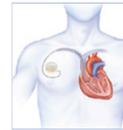
What is the scope of this directive?

Equipment is electrical or electronic appliances, as coffee makers, mobile phones, inverters for PV, ... and also components if they are sold to the end-user for integration in an equipment (as a CR-ROM drive).

Fixed installations are also in the scope, which are a particular combination of several types of apparatus assembled, installed and intended to be used permanently at a fixed location (e.g. a large machine in metal industry, a network, ...).



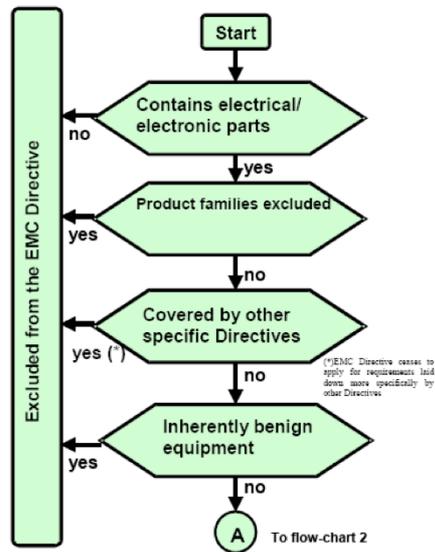
- Scope - exclusions
  - equipment covered by Directive RE (2014/53/EU)
  - aeronautical products (other regulations)
  - radio equipment used by radio amateurs, except if available commercially
  - equipment inherently not emitting (passive equipment, watch, electronic greeting cards)
  - equipment for which essential requirements are laid down in other directives (wholly or partly)
    - 90/385/EC: active implantable medical devices
    - 2004/22/EC: measuring instruments (water meter, gas meter, taximeters,)



The directive excludes specific equipment:

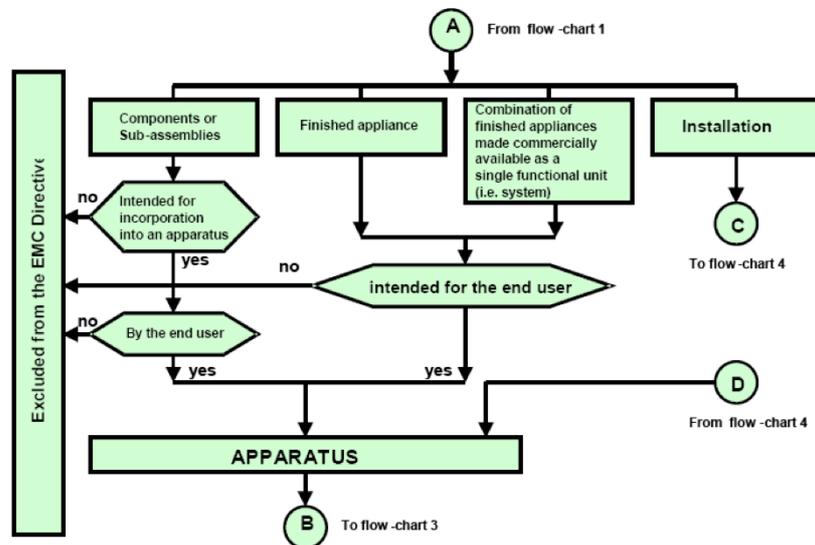
- Those covered by RED directive (2014/53/EU)
- Aeronautical products (covered by other regulations)
- Radio equipment used by radio amateurs, except if they are available commercially
- Equipment which are not inherently emitting (e.g. passive equipment, watch, electronic greeting card,...)
- Equipment for which essential requirements are laid down in other directives:
  - Active implantable medical devices (e.g. pacemaker) (90/385/EC)
  - Measuring instruments (water meter, gas meter, taximeter,...) (2004/22/EC)

## Directive 2014/30/EU



The scheme on the slide explains the decision making:

- Apparatus contains electrical or electronic parts? If yes, we continue, if no, it is excluded.
- Apparatus is in a product family excluded?
- Apparatus is covered by another specific directive?
- Apparatus inherently benign (not emitting)?

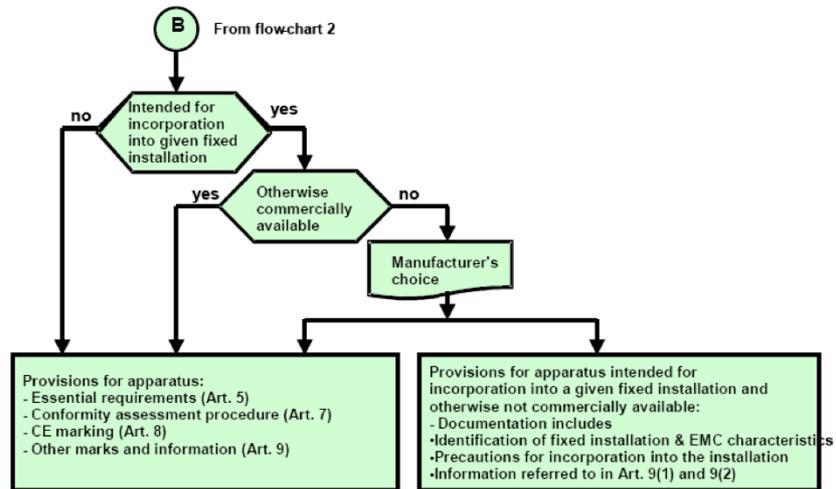


Next step (from A in chart 1):

- apparatus is a component or a sub-assembly? Is it intended for incorporation into an apparatus? So it is excluded. If it is sold to the end-user, so we continue.
- apparatus is a finished appliance? If yes, if it is sold to the end-user, so we continue.
- apparatus is a system (a combination of finished appliances made commercially available as a single functional unit)? If yes, if it is sold to the end-user, so we continue.
- finally is it an installation? If yes, we continue but with different requirements.



Flowchart 3 - Provisions applicable to apparatus



For an apparatus, provisions are to respect essential requirements, to apply conformity assessment procedure, to use CE marking.

For an apparatus intended for incorporation into a given fixed installation and otherwise not commercially available, provisions are to include documentation, to identify the fixed installation where it will be included, include precautions for incorporation in a proper manner in the installation.

## Directive 2014/30/EU Essential requirements

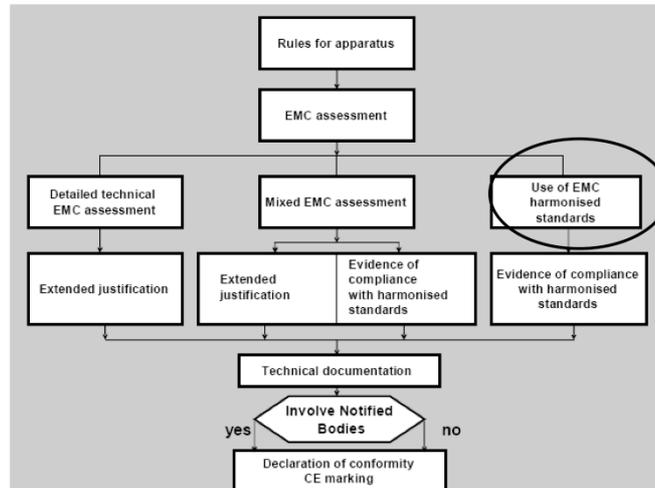


- Protection requirements for all equipment
  - Emission
  - Immunity
- Specific requirements for fixed installations
  - shall be installed applying good engineering practices and respecting the information on the intended use of its components with a view of meeting the protection requirements
  - The good engineering practices shall be documented and the documentation shall be held by the person responsible at the disposal of the relevant national authorities for inspection purposes.

## Directive 2014/30/EU



Flowchart 5 - Conformity assessment procedure for apparatus



The easiest and better solution to demonstrate the presumption of conformity is to apply harmonised standards and to demonstrate evidence of compliance with harmonised standards in a test report (accredited laboratory is better, but not mandatory).

When this presumption of conformity is demonstrated and all documents are available, it is required to demonstrate conformity with CE marking and a declaration of conformity.

## Directive 2014/30/EU Information



- Information requirements for all equipment
  - identification (type, batch, serial number...)
  - name & address of manufacturer
  - name & address of authorised representative in the Community
    - if manufacturer is not established in the Community
  - use instructions
  - specific precautions
    - to ensure the conformity with protection requirements
    - for installation, use and maintenance
  - a clear indication of use restrictions
    - e.g. if conformity is not insured in residential locations

Suppliers Declaration of Conformity (conform ISO 17050)

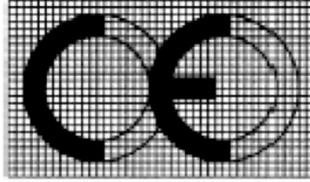


1. **Number of SdoC:** 23456
2. **Issuer's name:** Electronic Emission Presentation B.V.  
Immunitystreet 2  
Emission City  
Belgium
3. **Object of declaration:** Seminar Presentation Machine  
Honshu Model de Luxe
4. **The object of declaration described above is in conformity with the requirements of the following documents:**

<b>Document No:</b>	<b>Title</b>
2004/108/EC	EU EMC Directive (December 2004)
EU Harmonised standards	EN 88099:2009 EN 99099:2010 EN 99088:2008 Part X except Chapter Y
<b>EEP test method: 2009</b>	Test method XYZ. To cover the parts of EN 99088 not being applied
5. **Additional information** A technical documentation nr. Global Presentation nr. YZZ is available to document compliance of the excluded part of the harmonized standard
6. **Signed for and on behalf of:** Electronic Emission presentations B.V.
7. **Date:** 30 August 2010
8. **Name and Function:** Mr. E Veen Managing Director  


This is an example of declaration of conformity to be written and signed by the manufacturer.

## Directive 2014/30/EU CE Marking



The 'CE' marking must have a height of at least 5 mm. If the 'CE' marking is reduced or enlarged the proportions given in the above graduated drawing must be respected.

The 'CE' marking must be affixed to the apparatus or to its data plate. Where this is not possible or not warranted on account of the nature of the apparatus, it must be affixed to the packaging, if any, and to the accompanying documents.

Where the apparatus is the subject of other Directives covering other aspects and which also provide for the 'CE' marking, the latter shall indicate that the apparatus also conforms with those other Directives.

However, where one or more of those Directives allow the manufacturer, during a transitional period, to choose which arrangements to apply, the 'CE' marking shall indicate conformity only with the Directives applied by the manufacturer. In that case, particulars of the Directives applied, as published in the *Official Journal of the European Union*, must be given in the documents, notices or instructions required by the Directives and accompanying such apparatus.

## Directive 2014/30/EU Directive > Harmonised Standards



Cenelec	EN 55015:2006 Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment CISPR 15:2005	EN 55015:2000 + A1:2001 + A2:2002  Note 2.1	Date expired (01/09/2009)
	EN 55015:2006/A1:2007 CISPR 15:2005/A1:2006	Note 3	Date expired (01/05/2010)
	EN 55015:2006/A2:2009 CISPR 15:2005/A2:2008	Note 3	Date expired (01/03/2012)
Cenelec	EN 55015:2013 <b>(new)</b> Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment CISPR 15:2013 + IS1:2013 + IS2:2013	EN 55015:2006 and its amendments  Note 2.1	12/06/2016
Cenelec	EN 55020:2007 Sound and television broadcast receivers and associated equipment - Immunity characteristics - Limits and methods of measurement CISPR 20:2006	EN 55020:2002 + A1:2003 + A2:2005  Note 2.1	Date expired (01/12/2009)
	EN 55020:2007/A11:2011	Note 3	Date expired (01/01/2013)
Cenelec	EN 55022:2010 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement CISPR 22:2008 (Modified)	EN 55022:2006 + A1:2007	Date expired (01/12/2013)
	EN 55022:2010/AC:2011		
Cenelec	EN 55024:2010 Information technology equipment - Immunity characteristics - Limits and methods of measurement CISPR 24:2010	EN 55024:1998 + A1:2001 + A2:2003	Date expired (01/12/2013)

## Directive 2014/30/EU Transposition (Art. 16)



- Belgian law February 28, 2007 (new directive 2014/30/EU should be transposed before 20/04/2016 – not transposed on September 15th, 2016)
- Competent authorities:
  - SPF Economie – DG Energie
  - SPF Emploi – DG Contrôle du Bien-être au Travail
  - IBPT/BIPT
- Notified Bodies: <http://ec.europa.eu/growth/tools-databases/nando/>



# Standardisation in EMC

Véronique Beauvois, Ir.  
2016-2017



- Directives > Standards
- Standardisation committees
- International Level
- European Level
- National Level
- Standards types : basic, generic, product
- Conclusions



## Directives > Standards

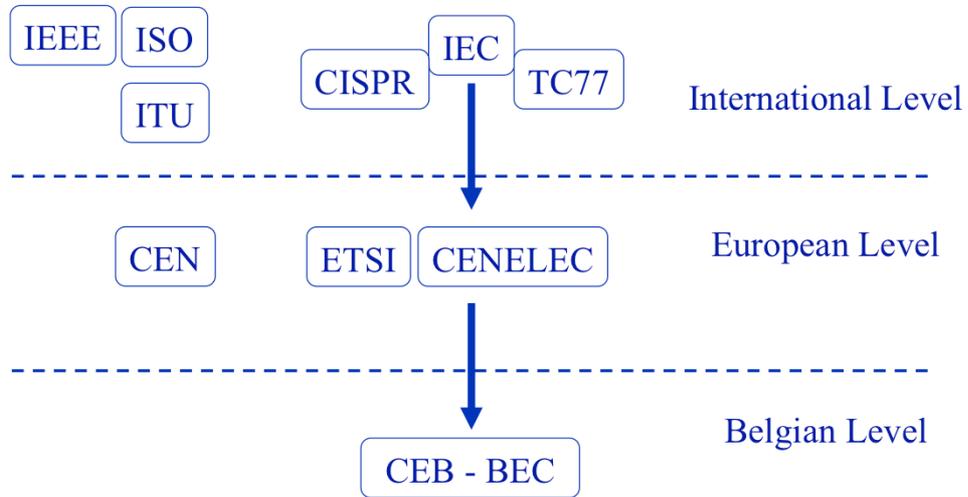
- « **New Approach** »: technical harmonisation which defines a clear difference between the responsibilities of the European legislator and the European standardisation committees (CEN, CENELEC, ETSI) in a legal framework to facilitate the movement of goods.



- European directives define essential requirements (health, safety and environmental issues);
- European standardisation committees publish technical specifications in standards to answer to the essential requirements (presumption of conformity) and then they are considered as “harmonised standards”.



## Standardisation Committees



## International Level (IEC / CISPR)



- Documents types: standards, reports, technical reports, guides
- IEC: divided in commissions and sub-commissions
- EMC:
  - TC 77** (1973) – horizontal commission – divided in sub- commissions
    - SC 77A (L.F.  $\leq 9$  kHz)
    - SC 77B (H.F.  $> 9$  kHz)
    - SC 77C (High power transient phenomena)

## International Level (IEC / CISPR)



- EMC:

**CISPR** (1933) (The International Special Committee on Radio Interference).

-Main task: from 9 kHz, prepare standards to protect radio reception from interference sources (IT, lighting, ISM, ...)

- divided in sub-commissions.

## European Level (CENELEC)



- Frequently IEC > CENELEC
- Divided in commissions and sub-commissions.
- EMC: TC 210 – horizontal commission – divided in W.G.

## Belgian Level (CEB-BEC)



- Bureau de Normalisation (**NBN**)
- Comité Electrotechnique Belge (**CEB-BEC**)
- Membre of IEC and CENELEC. Same TCs.
- Publication of standards from IEC and CENELEC
- **NBN** = Norme Belge – Belgische Norm
- Modifications, exceptions and/or possible additions

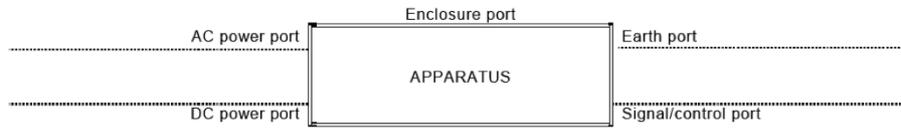
[www.nbn.be](http://www.nbn.be)



Type	Contents	Aims
<b>BASIC (*)</b>	<ul style="list-style-type: none"> <li>- Measurement and test methods</li> <li>- Instrumentation</li> <li>- Test set-up</li> <li>- Ranges of test levels (immunity)</li> <li>- No limits/No performance criteria</li> </ul>	<ul style="list-style-type: none"> <li>- Reference documents</li> <li>- No conformance testing of products (Not published in the OJEU list)</li> </ul>
<b>GENERIC</b>	<ul style="list-style-type: none"> <li>- Precise and essential requirements (limits) for all products intended for use in each environment i.e. residential, commercial, light industry and industry</li> <li>- Refer to basic standards for measurement/test methods (no repetition)</li> <li>- General performance criteria</li> </ul>	<ul style="list-style-type: none"> <li>- Conformance testing of products (Published in the OJEU list)</li> <li>- Co-ordination tool for product (family) standards</li> </ul>
<b>PRODUCT-FAMILY</b>	<ul style="list-style-type: none"> <li>- EMC requirements for product-families</li> <li>- More detailed performance criteria</li> <li>- Specific test set-up etc.</li> <li>- Refer to basic standards for measurements/tests (no repetition)</li> </ul>	<ul style="list-style-type: none"> <li>- Conformance testing of products (Published in the OJEU list).</li> <li>- Precedence over generic standards but to be co-ordinated with them.</li> </ul>
<b>DEDICATED PRODUCT</b>	<ul style="list-style-type: none"> <li>- Same as for product-family but more specific.</li> </ul>	<ul style="list-style-type: none"> <li>- Same as for product-family but more specific.</li> <li>- Generally not needed for emission</li> </ul>

[Cenelec Guide 24]

## Apparatus - Ports



Tests are related to different ports:

- Enclosure: E & H (LF & HF), DES
- Power supply ports ( AC/DC)
- Signal/Control ports (Ethernet, RS-232, ...)

## Basic Standards - Immunity



Electrostatic discharge (ESD)	IEC 61000-4-2	EN 61000-4-2
Radio-frequency electromagnetic field	IEC 61000-4-3	EN 61000-4-3
Electrical fast transients/burst - Surges	IEC 61000-4-4	EN 61000-4-4
Conducted high frequency disturbances	IEC 61000-4-5	EN 61000-4-5
Power-frequency magnetic fields	IEC 61000-4-6	EN 61000-4-6
Pulse magnetic fields	IEC 61000-4-8	EN 61000-4-8
Damped oscillatory magnetic fields	IEC 61000-4-9	EN 61000-4-9
Voltage variations, dips and interruptions	IEC 61000-4-10	EN 61000-4-10
Oscillatory waves	IEC 61000-4-11	EN 61000-4-11
Harmonics and interharmonics including mains signally at ac power port, low frequency immunity tests	IEC 61000-4-12	EN 61000-4-12
Voltage fluctuations	IEC 61000-4-13	EN 61000-4-13
Conducted low-frequency disturbances	IEC 61000-4-14	EN 61000-4-14
Ripple on dc input power port	IEC 61000-4-16	EN 61000-4-16
Unbalance	IEC 61000-4-17	EN 61000-4-17
Variation of power frequency	IEC 61000-4-27	EN 61000-4-27
Voltage variations and dips on dc power ports	IEC 61000-4-28	EN 61000-4-28
	IEC 61000-4-29	EN 61000-4-29

[Cenelec Guide 24]



## Generic Standards

### 1 - Residential, commercial and light industrial

EN 61000-6-3 Generic emission standard.

EN 61000-6-1 Generic immunity standard.

### 2 - Industrial

EN 61000-6-4 Generic emission standard.

EN 61000-6-2 Generic immunity standard.

[Cenelec Guide 24]



Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air		Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines		Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode		Mains power quality should be that of a typical commercial or hospital environment.

### Basic Standards