



# RADIOMODULER

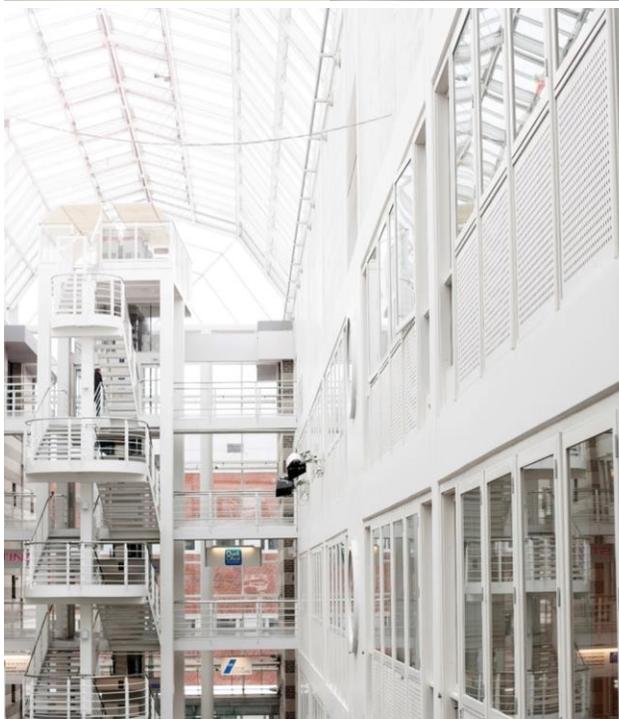
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January 2017

RISE Research Institutes of Sweden

**Safety and Transport  
Electronics**



# What is a Radio equipment?

- **2014/53/EU Article 2, Definitions**

- (1) **'radio equipment'** means an electrical or electronic product, which intentionally emits and/or receives radio waves for the purpose of **radio communication** and/or **radiodetermination**, or an electrical or electronic product which must be completed with an accessory, such as antenna, so as to intentionally emit and/or receive **radio waves** for the purpose of radio communication and/or radiodetermination;
- (2) **'radio communication'** means communication by means of **radio waves**;
- (3) **'radiodetermination'** means the determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to those parameters, by means of the propagation properties of radio waves;
- (4) **'radio waves'** means electromagnetic waves of frequencies lower than 3 000 GHz, propagated in space without artificial guide;

# What is a Radio module?

- If a radio module meets the definition of a radio (as per Article 2 of the RE-D) and is to be placed on the market in the EU, then it is within scope of the RE-D and must be assessed to the RE-D; regardless of whether the radio module is sold openly on the public market, or supplied exclusively through a **business-to-business** contract.
- Examples of Radio modules
  - Any radio (such as a circuit board, IC, hybrid circuit, plug-in unit, etc.), which together with an antenna, constitutes the transmitter, receiver or transceiver for radio communication or radio determination, which has defined RF parameters and which can clearly be identified.
  - A plug-in unit which can be characterised as a radio intended to be used with or within a host, combined or multi-radio equipment, using their control function and power supply, such as an internal mini PCI module or a USB Dongle.



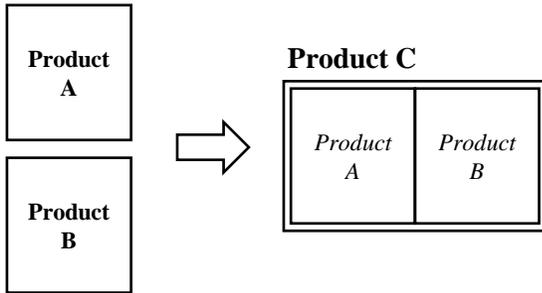
# Components=Radio equipment??

- Under discussion!
- Draft RED guide: *Components that communicate with radio waves after they are completed with other accessories (e.g. when integrated into another radio product) fall within the scope of the Directive and shall comply with the RED if they are placed on the EU market;*
  - *the manufacturer of such a component is not required to perform assessment for those parts which depend on how the component is assembled or integrated; however, the intended and reasonably foreseeable use have to be assessed as in Article 17(1).*
  - *The manufacturer of this component is required to provide instructions which ensure that the component is compliant when these instructions are followed; **with respect to the final finished radio product, the person who places it on the market is the responsible manufacturer and shall ensure that it complies with the RED.***
- Note:
  - Still under discussion. Ex. Qualcomm IC components would probably not be CE marked.
  - Still under discussion. Probabaly it will depend on how you marketed your device. Ex. If you sell it as a module for incoperation into a non-radio host.

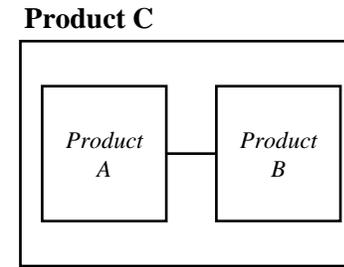
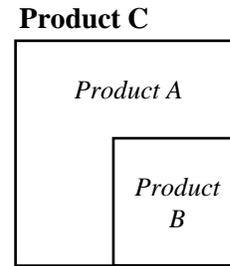
# Combinations of radio module and host products

- **combined equipment:** equipment consisting of two or more products where at least one of which is radio communication or radio determination equipment (i.e. radio equipment as defined in the RED )

## Concept



## Examples



- Product A and Product B are products in their own right. At least one of these is a radio product as defined in the RED (i.e. transmitter, receiver or transceiver). Both Product A and Product B could have been assessed and placed on the EU market individually according to the applicable EU Directive(s).
- Product C is a new product constructed by the combination of Product A and Product B (e.g. Product B installed in Product A, Product A and Product B installed in a common enclosure, etc.) and falls under the scope of the RED as a result of the combination.

# Combinations of radio module and host products

- At the moment of placing on the market, the RE-D is applicable to the **combination of the radio module and the host product as a single product**, if the radio (module) equipment is:
  - Incorporated into the host product; and
  - Permanently affixed to the host product (i.e. in such a way that it cannot be easily accessed and readily removed).
- In all other cases, **only the radio module is subject to RED** and is deemed to be a separate product.

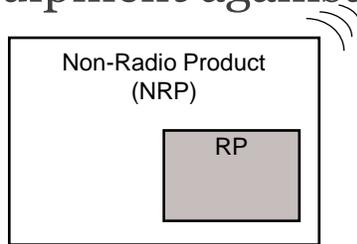


# Combinations of radio module and host products

- *At the moment of placing on the market, the RE-D is applicable to the **combination of the radio module and the host product as a single product.***
- **Exceptions:**
- Radio equipment installed in hosts normally falling under a type approval legislation
- **Example:** The radio is installed into a vehicle; the host vehicle does not become a final radio product and therefore is not assessed to the RE-D. In such a case, the radio module remains the CE Marked radio device, even if permanently installed within the vehicle.

# Conformity Assessment procedures (CAP)

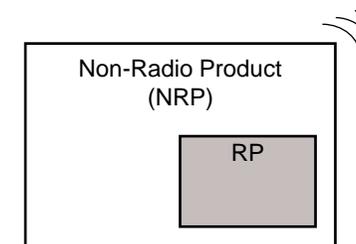
- The manufacturer of the combined equipment is responsible to ensure the conformity of the equipment against the RED



- At the choice of the manufacturer, 2 CAP alternatives can be used
  - Alt 1: Apply RED CAP for the whole combined equipment or,
  - Alt 2: “Combined approach”
    - Apply RED CAP for the RP
    - Apply EMC/CD CAP for the NRP
    - Apply “Delta” CAP for the combination
- **If a given equipment cannot be separated into radio and non-radio constituent products that can be assessed individually, then such equipment would not qualify for this combined equipment and then RED CAP would apply to the equipment as a whole**

# CAP-”Combined approach”

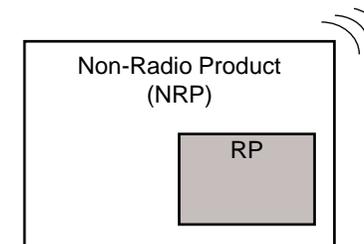
- **Product safety** according to Article 3.1a of the RE-D will be required at the final radio product level.
  - A product safety assessment of a radio module is very unlikely to correspond with the product safety assessment of a final radio product.
- **EMC performance** of the radio module will have been assessed by the radio module manufacturer; but EMC performance according to Article 3.1b of the RE-D must also be compliant for the final radio product.
- **Radio performance** according to Article 3.2 of the RE-D may be performed at the final radio product level, but also the final radio product manufacturer may be able to utilise some test data or test results from measurements made of the radio module.



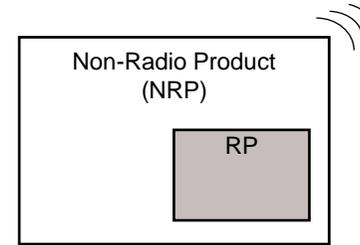
# CAP-”Combined approach”

## ■ EMC performance

- The EMC standard for the Non-Radio product (NRP), sometimes called Primary product standard, is the one you start with as base in your EMC requirement matrix
- Then you add the Radio Product (RP) EMC standards (eg ETSI EN 301 489 series) to the matrix.
- The Primary product standard often defines the environment requirements Ex. Immunity levels etc
  - Requirements from Primary product standard are not carried over to non-overlapping ranges!
- NRP performance criteria will be verified against Primary product standard
- RP performance criteria will be verified against ETSI EN 301 489



# CAP-”Combined approach”



## ■ Radio performance

- Re-use of existing test data
  - Radio transmitter or receiver measurements made as conducted measurements at the radio module antenna port may be considered applicable to the radio performance of the final radio product, at the decision of the manufacturer of the final radio product, when installing the radio module.
  - For example, measurements of test cases such as the signal bandwidth, transmitter timing, duty cycle, frequency hopping rates, etc., measured on the radio module, may be considered consistent with the values expected when the module is installed into the host product; and therefore the installer of the radio module into the final radio product may choose not to repeat those tests on the final radio product.
- Radiated test cases, however, such as radio spurious emissions, e.i.r.p., critical receiver performance, etc., may not be comparable from the radio module to the final radio product and needs to be retested on final product.

# Compliance of the Combined equipment (final product)

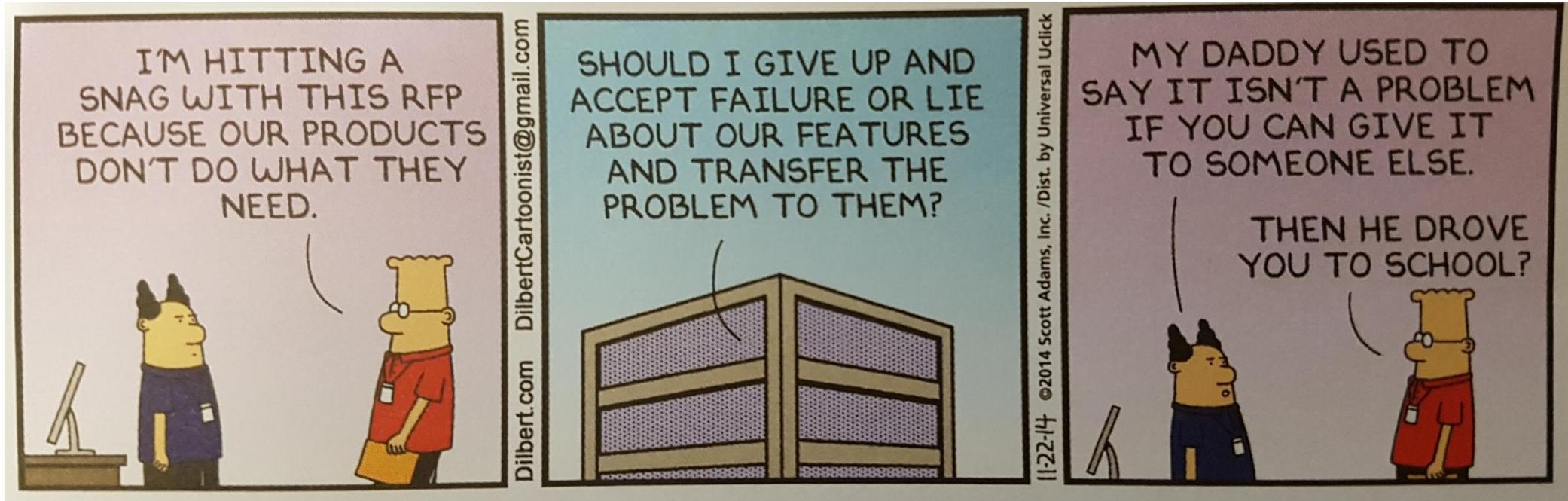
- **The manufacturer of the combined equipment is responsible to ensure the conformity of the equipment against the RED**
- Any acceptance of test data from the radio module by the final radio product manufacturer, would need to be detailed in the final radio product manufacturers' technical documentation and risk assessment.
- If the **radio module test data** for Article 3.2 of the RE-D **is not available** or not supplied to the manufacturer of the final radio product; the final radio product may need to be **fully tested** to provide the final radio product manufacturer with the information needed to state compliance with the RE-D.

# THANK YOU!

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