



## Update regarding EMC-standardisation

Condensed presentation at the EMC Competence Group meeting 11 June 2020

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# Update regarding EMC-standardisation

## Overview

- What has happened the last few years?
- And, - where are we heading?
- This presentation have to be short, so the picked subjects are somehow influenced by where I'm personally involved.

# Update regarding EMC-standardisation

What has happened the last few years?

- Something I've been told: Decades ago different industry segments were eager to develop their own specific EMC-standards (something like *"Our segment is so important that it requires our own standards"*).
- Now, there's much more awareness that the numbers of standards should only be increased if there are good arguments for a new standard (though, those good arguments could still be a strong team of industry people wanting a specific standard, - but it's rather seldom).
- In my view a very recent example of this seldom occurrence is *IEC 61000-6-8: Emission standard for professional equipment in commercial and light-industrial locations* (Normally commercial and light-industrial environments require residential limit levels, but here industrial limits are applied. Professional installation and maintenance is required). It's not an international standard yet, but close (a question of months).
- At the very start a few National Committees (including the Danish) did raise the question: *"Is there really a need for this standard?"*, but obviously the working group wanted it, so...

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What has happened the last few years?

- Probably the most important examples of minimalization are: Compiling the A/V and IT areas (Multimedia emission standard CISPR 32 has replaced CISPR 13 (A/V) and CISPR 22 (IT), and Multimedia immunity standard CISPR 35 has replaced CISPR 20 (A/V) and CISPR 24 (IT)).
- Off course e.g. CISPR 32 is then a more comprehensive standard than both CISPR 13 and CISPR 22, but you don't have the argumentation "*is this a CISPR 13 or a CISPR 22 product?*".
- The range of basic standards have not changed (the basic electromagnetic phenomena's are covered). Though, one addition is the broadband impulsive conducted immunity test for xDSL-ports in CISPR 35.
- The upper frequency range for radiated emission and immunity testing has moved up from 1 GHz to 6 GHz, but the levels have not changed.

# Update regarding EMC-standardisation

Where are we heading?

- **Up in frequency:**
- The upper frequency range for radiated emission and immunity testing will be increased, with emission as the front runner. The planned steps were from 6 to 18 GHz and then from 18 GHz to 40 GHz. The immunity will follow.
- But 5G has introduced use of even higher frequencies. In ETSI TS 138 101-1 the two frequency ranges 410 MHz to 7,125 GHz (FR1) and 24,250 GHz to 52,600 GHz (FR2) have been allocated for 5G use.
- And radars used by the automotive industry uses frequencies up to 72 GHz! and they're already in use.

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Where are we heading?

- Up in frequency:
- I've just prepared a comment from The Danish National Committee encouraging the international standardization to include these 5G and radar frequencies as soon as possible.
- All EMC standards stop the frequency coverage at 400 GHz, so we're closing in!
- These high frequency ranges probably requires development of new test methods and (to an even higher degree) new test instrumentation is required. Such costly test equipment as the presently used test chambers probably require considerable changes.
- The industry people really pushes the standardization people!

# Update regarding EMC-standardisation

Where are we heading?

- **Down in frequency:**
- The number one role of CISPR is to perform standardization for the protection of radio reception in the range 9 kHz to 400 GHz.
- Traditionally the protection has been obtained by performing radiated emission above 30 MHz. Below 30 MHz the protection of radio transmission has been obtained by performing conducted emission on the (long) cables connected to the electronic equipment. If the conducted emission was below the limit, then the radiated emission from the connected cables could be estimated to be sufficient low for the protection.
- This condition is now challenged by the concept of Wireless Power Transfer (WPT). Using WPT e.g. in the frequency range 79 kHz to 90 kHz for charging electric cars the transferred power can be up to 200 kW.
- Here's a very powerful magnetic source, so the concept of conducted emission can't be applied. The leaking magnetic field to the surroundings is measured and has to be below the limit value.
- With WPT the radiated emission below 30 MHz has now become an issue.

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Where are we heading?

- Down in frequency:
- The really big problem here was to reach consensus regarding the limit values.
- Initially the industry people came up with their suggestions for limit values, while the users of the radio reception claimed these limit values didn't provide the required protection, - the well-known problem of setting up claims not founded on the same basis.
- Due to these clashing opinions, the settling of limit values for WPT was halted for more than two years.



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Where are we heading?

- **Down in frequency:**
- A consensus was reached recently (just a couple of months ago) by applying the second edition of the standard CISPR 16-4-4 and its very recent amendments.
- This standard describes a method of assessing limit values, where many factors are included:
  - a. The required field strength for the reception to be reliable.
  - b. Does the source emit in the direction of the victim?
  - c. Is the victim sensitive in the direction of the source?
  - d. Does the source and victim operate at the same time?
  - e. And several other factors.
- The first edition of CISPR 16-4-4 appeared in 2003 (so it's not a new standard), but it was simply too difficult to apply. First with the recent two amendments (from 2017 and 2020) the standard has become operational.
- By accepting and applying the (now useful) CISPR 16-4-4 as the starting point, the standardization work should be more efficient and results should be produced more swiftly. And this is really a much needed issue in standardization.

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And now, - there could be time for a few questions.