LED TECHNOLOGY CAUSING ELECTROMAGNETIC INTERFERENCE

IVR Technical Leaflet

Experience has shown that LED lighting can cause electromagnetic interference (EMI). This can disrupt the operation of radio communication and navigation equipment on board.

Poorly designed or cheap LED lamps in particular contain an integrated switching regulator. The fast switching flanks of this regulator cause electromagnetic radiation to be emitted within a broad HF spectrum.

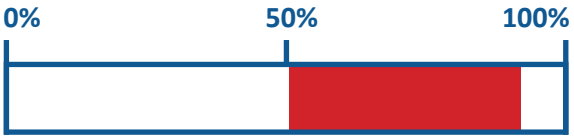
Although the LED lighting complies with the various relevant standards for navigation lights and searchlights, such as EN 60945 and EN 55015. Installation in the vicinity of antennas can still interfere with radiotelephone reception.

The interference disappears as soon as the lights are switched off. There are also LED lights on the market that do not interfere with the reception of AIS information.

The AIS device's range can be reduced by between 50% and 90%.

This type of interference is caused by certain LED lights, such as searchlights, navigation lights, or decorative lighting (including in the wheelhouse).

The interference is particularly noticeable when such lights are placed close to antennas.



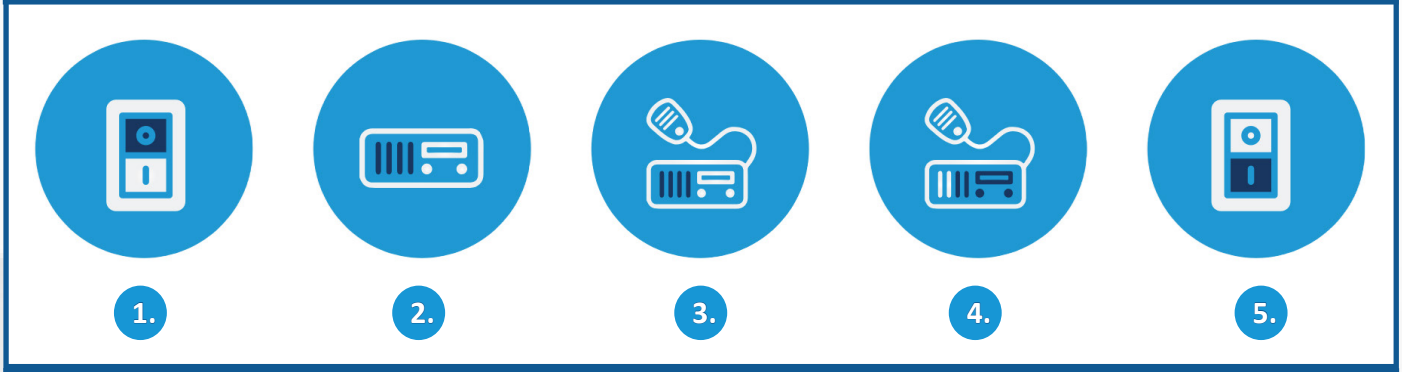
LED lighting has been found to be a major source of EMI, as it can affect the operation of many radio services across a wide frequency range.

Both directly through radiated signals and indirectly through conducted signals via electrical supplies. EMI can also originate from outside the vessel. For example, there are known cases where LEDs in structures near the waterway caused interference.

This electromagnetic interference can lead to dangerous situations and thus compromise the safety of inland shipping.

HOW TO FIND OUT IF THERE IS LED-INTERFERENCE

Strong radio interference from LED sources is not always immediately noticeable to maritime radio users. However, its presence can be determined by this test procedure:



1. Turn off the LED light(s).
2. Tune the VHF radio to a quiet channel.
3. Adjust the VHF radio's squelch control until the radio outputs audio noise.
4. Re-adjust the VHF radio's squelch control until the audio noise is quiet, only slightly above the noise threshold.
5. Turn on the LED light(s).

If the radio now outputs audio noise, then the LED lights have raised the noise floor. (Noise floor is the amount of interfering signals/static received beyond the specific signal or channel being monitored.)
If the noise floor has been raised, then it is likely that both shipboard VHF marine radio and AIS reception are being affected by LED lighting.

REQUIREMENTS

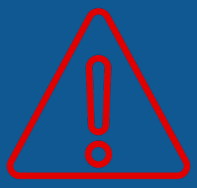
LED lights on board must comply with standard EN 60945 (2002) including IEC 60945 corrigendum 1 (2008) or standard IEC 60945 (2002) including IEC 60945 corrigendum 1 (2008).

When inspecting radio communication systems, tests can be carried out to ensure that LED lighting does not interfere with the systems, in order to guarantee correct operation.

BE AWARE

Electrical and electronic equipment must be installed in such a way that the EMI they generate does not interfere with the performance of navigation and radio communication systems.

It is the responsibility of the shipowners to pay attention to LED light sources and light fittings, with particular attention to possible interference with internal radio communication-equipment.



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