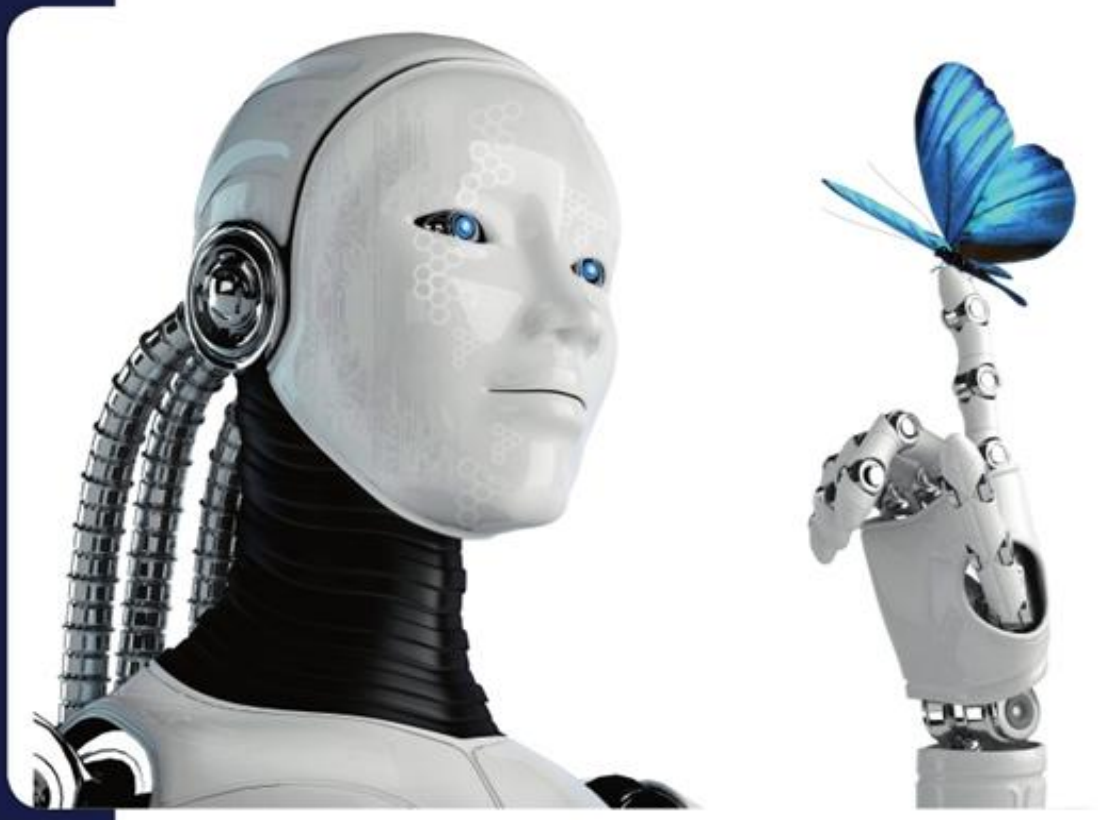
Newsletter
November, 2025

ICR



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Hot Issue

1. UNECE R10 Rev.6 - Amendment 4
   (E-mark Regulation) updated
2. Military EMC Standard
   MIL-STD-461H Draft Review
3. IEC 61000-4-5 Surge immunity test
4. Revaluating the Role of Internal Audits

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ECE R10 Rev.6 - Amendment 4 (E-mark Regulation) updated

▣ UNECE R10 Rev.6 Amendment 4 updated

The United Nations Economic Commission for Europe has announced **Amendment 4 to UNECE Regulation No. 10 Revision 6,** which defines the electromagnetic compatibility(EMC) testing requirements applicable to motor vehicles and their electronic equipments.

Agreement

Concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations*

(Revision 3, including the amendments which entered into force on 14 September 2017)

Addendum 9 – UN Regulation No. 10

Revision 6 - Amendment 4

Incorporating all valid text up to:

07 series of amendments – Date of entry into force: 12 June 2025

Uniform provisions concerning the approval of vehicles with regard to electromagnetic compatibility

This document is meant purely as documentation tool. The authentic and legal binding text is: ECE/TRANS/WP.29/2024/90.

UNITED NATIONS

ECE R10 Rev.6 - Amendment 4 (E-mark Regulation) updated

▣ Key Updates for Automotive Electronic Components

1) The Reverberation chamber test added

2) Frequency band expanded for RI and ALSE tests

- amendment 3: up to 2GHz → amendment 4: up to 6 GHz

3) CTI test: pulse 1, 2a, 2b, 3a, 3b reference standard changed to the 2011 edition

▣ ICR is a ECE R10 Testing Laboratory

To export automotive electronics to Europe, you need to obtain **E-mark certification**, which is a compulsory certification.

As a testing organization that conducts the updated latest version of the **ECE R10 test** required for E-mark certification, **ICR** will always do its best to provide high-quality testing services and to facilitate the business of our customers.

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Military EMC Standard MIL-STD-461H Draft Review

▣ MIL-STD-461H Draft

On July 22, 2024, the U.S. Department of Defense released the draft version of MIL-STD-461H, as the latest revision of the MIL-STD-461 specification, an electromagnetic test specification applied to military equipments.

▣ Changes to MIL-STD-461H Draft

❖ 5.4.1 CE101 applicability

- This requirement is applicable from **30 Hz to 20 kHz** for power leads, including returns, that obtain power from other sources not part of the EUT. This requirement applies to surface ships, submarines, Navy aircraft1/ with Anti-Submarine Warfare (ASW) equipment operating between 30 Hz and 10 kHz (such as Acoustic Receivers, Sonobuoy, or Magnetic Anomaly Detectors), and Army aircraft1/ (including flight line). This requirement is not applicable to power leads that do not directly interface with the platform power bus. **1/ For aircraft AC applications, this requirement is only applicable from the second harmonic of the EUT power frequency to 10 kHz. For aircraft DC applications, this requirement is only applicable from 30 Hz to 10 kHz.**

Military EMC Standard MIL-STD-461H Draft Review

- CE101 Test Frequency Range Change
  30 Hz ~ 10 kHz -> 30 Hz ~ 20 kHz
  (However, the Aircraft range is from 30 Hz to 10 kHz)

❖ 5.4.3.5 Data presentation.

e. Emissions plots shall include the nominal measured current value of the fundamental power frequency for each respective plot.

f. Provide photographs showing actual equipment test setup, including equipment grounding and the associated dimensions

- CE101 Data presentation. item specifies the current value of the Fundamental frequency of the power line of each data and adds that the setup photo should be displayed in the report at the time of the actual measurement.

❖ 5.5.1 CE102 applicability

- This requirement is applicable from 10 kHz to 10 MHz for all power leads, including returns, which obtain power from other sources not part of the EUT. **This requirement is not applicable to power leads that do not directly interface with the platform power bus.**

Military EMC Standard MIL-STD-461H Draft Review

- **Added that if the input power of the EUT is not connected to the system power bus, the CE102 test will not be conducted on the power line.**

❖ **5.5.3.4 Procedures.**

- **(2)** Apply a signal level of 90 dBμV at 10.5 kHz and 100 kHz to the power output terminal of the LISN. At 10.5 kHz and 100 kHz, use an oscilloscope, in high impedance mode, to verify that there is a proper signal level at the LISN and verify that it is sinusoidal. After establishing the proper signal at the LISN, disconnect LISN and measure resulting voltage using an oscilloscope with 50-ohm input impedance. The ratio of the LISN voltage to the 50-ohm voltage measurement must be within the following tolerances: at 10.5 kHz = -14 dB (+1 dB/-2 dB) and at 100 kHz = -3 dB (+1 Db /-2 dB).

  An alternative method to verify the LISN impedance is descry-bed in SAE AIR6236. These results shall be documented in the EMI Test Report.

Military EMC Standard MIL-STD-461H Draft Review

- **(3)** Apply a signal level that is at least 6 dB below the limit at 10.5 kHz, 100 kHz, 1.95 MHz and 9.8 MHz to the power output terminal of the LISN. At 10.5 kHz and 100 kHz, use an oscilloscope **(set to high impedance)** to calibrate the signal level.
  At 1.95 MHz and 9.8 MHz, use a calibrated output level directly from a 50 Ω signal generator.

- SAE AIR6236 standard was added as an alternative method for LISN impedance verification measurement.

- Added that the LISN impedance value should be written in the transcript.

- 10.5 kHz at system check and 1 ohm oscilloscope input impedance at 100 kHz measurement.

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IEC 61000-4-5
Surge immunity test

▣ EN 61000-4-5

This standard specifies the immunity requirements, test methods and recommended test level ranges for equipment related to unidirectional surge caused by switching and lightning **over-voltages.**

▣ Surge immunity test

This test evaluates the performance of electrical and electronic equipment when **over-voltages** or **very fast noise pulses** caused by lightning stroke or switching are applied to power supply ports, signal ports, control ports, etc.

▣ Surge generator

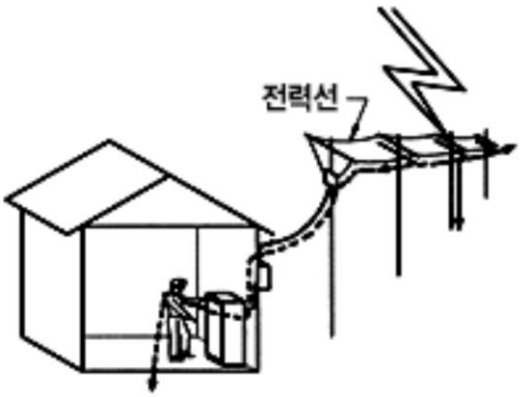
This equipment artificially generates surge to verify whether the equipment under test operates without issues under **over-voltages** conditions such as lightning stroke or switching.

IEC 61000-4-5
Surge immunity test

▣ Causes of surges

Surge is caused by **power system switching transients**(e.g. capacitor bank switching, load changes in the power distribution system). They can also be caused by **lightning transients**, such as **direct lightning stroke** that high currents flowing through ground resistance and external circuit impedance generate voltage and **indirect lightning stroke** that induce voltage/current in conductors outside and inside buildings.

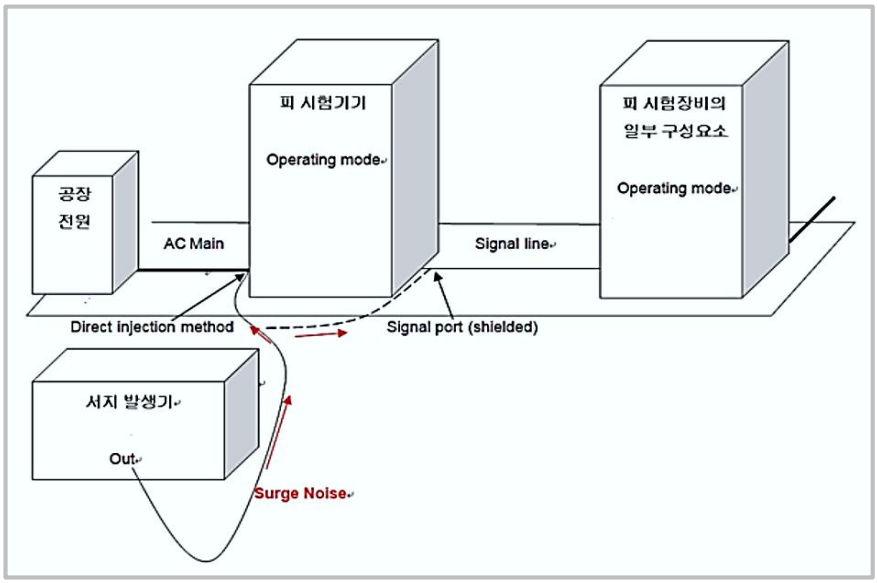
Direct lightning stroke
(Source of information: LPSKOREA)



Indirect lightning stroke
(Source of information: LPSKOREA)

IEC 61000-4-5
Surge immunity test

▣ Test structure



▣ Test levels

Test scope	Test conditions	Performance criterion
AC I/O POWER	Line to line : ±1 kV Line to earth : ±2 kV Front time T_f1) : 1.2 μs Duration time T_d2) : 50 μs	B[3)]
DC I/O POWER	Line to line : ±0.5 kV Line to earth : ±1 kV Front time T_f1) : 1.2 μs Duration time T_d2) : 50 μs	B[3)]
SIGNAL/CONTROL LINE	Line to earth : ±1 kV Front time T_f1) : 1.2 μs Duration time T_d2) : 50 μs	B[3)]

1) A parameter that indicates the rate at which the surge waveform rises.
2) A time interval that indicates how long the energy in the surge waveform lasts.
3) Temporary degradation is allowed, but self-recovery must occur after the test.

IEC 61000-4-5
Surge immunity test

▣ Test equipment photo

Surge generator

▣ Test photos

▣ **ICR** has test equipment for EN 61000-4-5 standard and can perform on-site testing.

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Revaluating the Role of Internal Audits

▣ Internal Audits - From Formality to Strategic Value

Many organizations still regard internal audits as a formal procedure or a mandatory step for maintaining certification.

However, international management system standards such as **ISO 9001, ISO 14001, and ISO 45001** emphasize that internal audits should serve as a **strategic mechanism** to enhance organizational performance—not merely a compliance checkpoint.

▣ The True Value of Internal Audits

❖ Early Detection and Risk Management

By proactively identifying vulnerabilities before external audits, organizations can minimize potential risks and strengthen operational stability.

❖ Catalyst for Continuous Improvement (CI)

Internal audits go beyond regulatory verification. They act as a practical enabler of continuous improvement, helping organizations design efficient and innovative processes.

Revaluating the Role of Internal Audits

❖ Actionable Tool Reflecting On-Site Insights

When employees actively participate in audits, their field-level feedback becomes an invaluable input for management decision-making, providing real-world operational insights.

❖ Strengthening a Growth-Oriented Organizational Culture

When viewed not as an obligation but as a collaborative process for growth, internal audits foster a culture where all members engage voluntarily in advancing quality, safety, and environmental performance.

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Revaluating the Role of Internal Audits

▣ Step 1 - Audit Planning

Category	Details
Establish an Annual Audit Plan	Ensure all processes and departments are covered at least once a year.
Risk-based Approach	Focus on areas with higher risks such as customer complaints, safety incidents, or environmental issues.
Define Clear Objectives	Aim not only for compliance but also for identifying opportunities for improvement.

▣ Step 2 - Audit Preparation

Category	Details
Develop an Audit Checklist	Combine ISO standard requirements with internal procedures and recent issues (e.g., nonconformities, KPI deviations).
Review Background Information	Examine manuals, procedures, performance data, and past audit results.
Communicate in Advance	Share the audit schedule and interview subjects with relevant departments beforehand.

Revaluating the Role of Internal Audits

▣ Step 3 - Conducting the Audit

Category	Details
Opening Meeting	Clarify the audit's purpose, scope, and methods to ease participants' concerns.
Interviews and Evidence Collection	• Encourage explanations of actual practices rather than simple "yes/no" answers. • Verify consistency between operations and documented procedures.
Gather Objective Evidence	Include documents, records, interview notes, or photos.
Maintain a Cooperative Tone	Focus on improvement, not fault-finding—build trust and open communication.

▣ Step 4 - Audit Reporting

Category	Details
Classify Findings	• Nonconformities: Cases that do not meet ISO or internal requirements. • Observation : Areas with potential for improvement but still compliant. • Good Practice : Examples worth sharing with other departments.
Closing Meeting	• Present key findings and discuss improvement actions. • Emphasize that audits aim to support growth, not assign blame.

Revaluating the Role of Internal Audits

▣ Step 5 - Corrective Actions & Follow-up

Category	Details
Prepare a Corrective Action Report	Clearly define responsibilities, deadlines, and corrective measures.
Use Root Cause Analysis (RCA)	Address underlying issues to prevent recurrence rather than applying quick fixes.
Verify Effectiveness	Ensure corrective actions lead to measurable improvement.
Link to Continuous Improvement:	Reflect audit outcomes in management review meetings.

▣ Conclusion

Internal audits have evolved into a **strategic instrument** for identifying growth opportunities and transforming risks into competitive advantages. A structured, meaningful approach to internal audits ultimately leads to **performance-driven organizational innovation.**

ICR remains dedicated to supporting our clients in achieving **systematic certification management** and **practical, continuous improvement initiatives.**

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