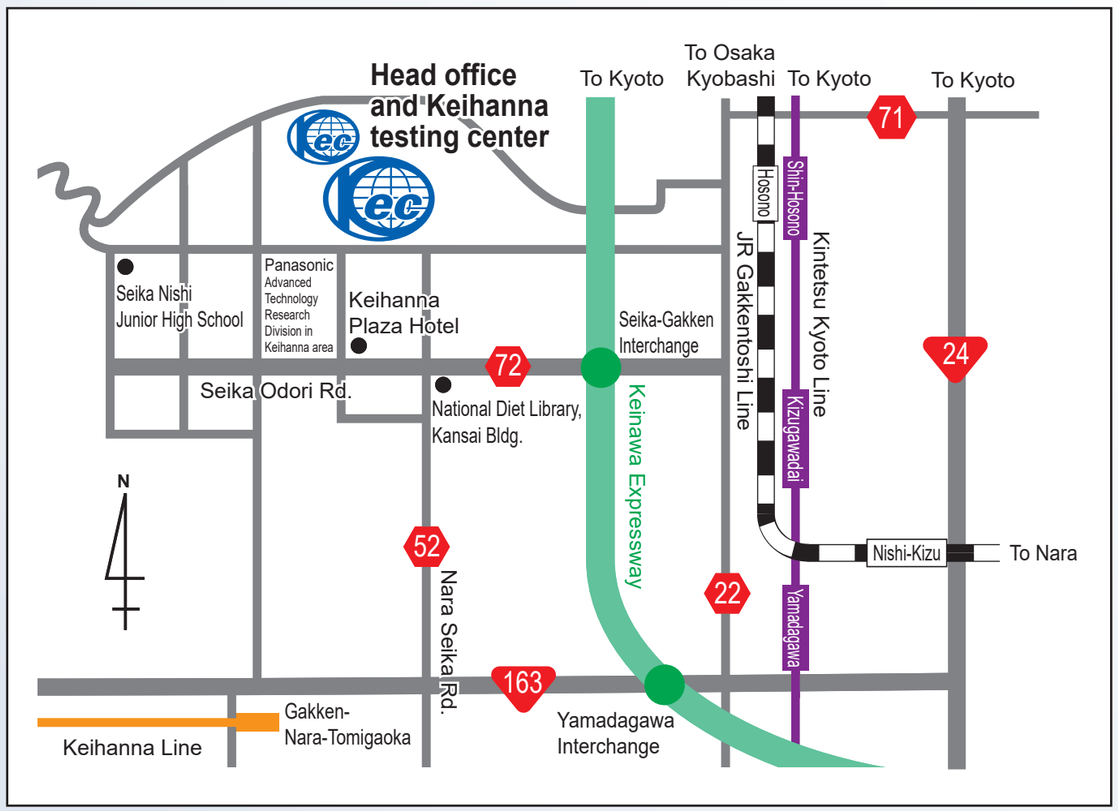
KEC Electronic Industry Development Center

General Incorporated Association

KEC Electronic Industry Development Center https://www.kec.jp/



3-2-2, Hikari-dai, Seika-cho, Soraku-gun, Kyoto, 619-0237 Japan
TEL: +81-774-93-4563 FAX: +81-774-93-4564

General Incorporated Association
KEC Electronic Industry Development Center

2020.6

Reliable partner supporting the industry　for promoting the future of electronics

Message from the chairman

In 1961, KEC Electronic Industry Development Center (KEC) was established with support of the Ministry of International Trade and Industry (currently known as the Ministry of Economy, Trade and Industry) and the Osaka prefectural government.

Since then, supported by various cooperation partners, toward a more thriving electronics industry, we have engaged in the committee management business that aims to promote research and investigation on advanced technologies and streamlined manufacturing and support growth of engineers by sharing information about state-of-the-art technologies, as well as the EMC and product safety testing business that provides evaluation technologies to help production of safe and reliable products.

Our committee management business includes holding of various technical seminars for learning leading technologies, organization of training courses for engineers, and administration of international certification exams for EMC and product safety engineers in business alliance with iNARTE (currently known as Exemplar Global, Inc.) in the U.S.

For our EMC and product safety testing business, using the well-equipped testing facilities with about 20 rooms including large and small anechoic chambers and shielded rooms that have been certified by major Japanese and foreign accreditation bodies, we help customers perform EMC tests and product safety tests necessary for their product development.

KEC will strive to further expand our committee activity, timely and advanced test facilities and staff technical skills to serve increasing customers' expectations. We also hope to contribute to the growing electronic industry.

Please kindly give your support and encouragement of KEC.

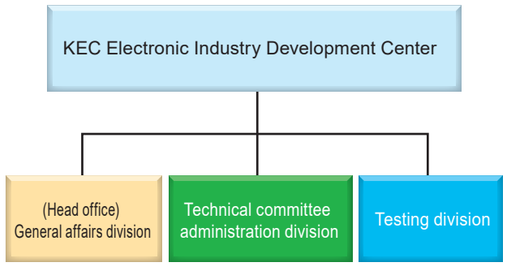
History of KEC Electronic Industry Development Center (KEC)

1961	KEC was founded for advancement of electronic engineering by the promoters consisting of 24 companies with the support of the Ministry of Economy, Trade and Industry and the Prefecture of Osaka. KEC started cooperative research and development activities among the industry, the academia and the government bodies.
1970	KEC started measurement services of spurious emission from electronic apparatuses.
1980	KEC extended its services of performing immunity measurements of electronic apparatuses, and organized technical engineering working groups.
1990	KEC sent out messages across the nation inviting participation in the committee activities, and announcing the start of the EMC measurement services.
1993	EMC Measurement Center was established (10 m anechoic chamber).
1996	KEC held its first annual EMC Kansai Seminar.
1998	KEC started the NARTE qualification test program.
2000	KEC expanded the EMC measurement services and the educational training program for EMC engineers.
2005	KEC opened the new Keihanna Test Center.
2008	KEC relocated the EMC and product safety testing business to the Keihanna area.
2010	KEC obtained the approval for shifting to a general incorporated association and changed the legal name.
2011	KEC relocated the head office to the Keihanna area to consolidate the business functions.
2017	KEC opened the anechoic chamber building at the Keihanna testing center area.

KEC supports your technical improvement with both committee management business and EMC and product safety testing business.

Head office and Keihanna testing center

Organization chart

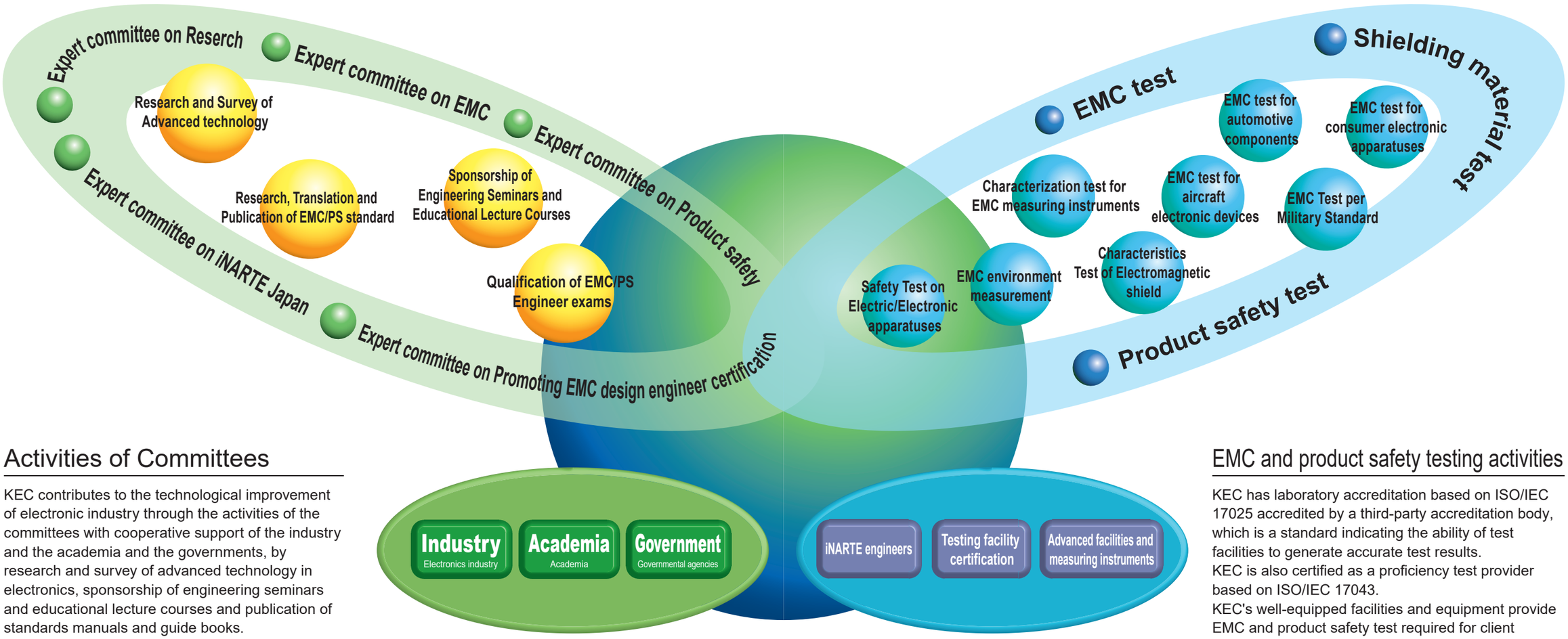


Administrative structure

Chairman 1 person
Vice-chairman 3 persons
Senior managing Director 1 person
Managing Director 1 person
Director 10 persons
Auditor 2 persons
Member 246 companies (as of June 9, 2023)

Ikoma testing site No. 1

Ikoma testing site No. 2



Activities of Committees

KEC contributes to the technological improvement of electronic industry through the activities of the committees with cooperative support of the industry and the academia and the governments, by research and survey of advanced technology in electronics, sponsorship of engineering seminars and educational lecture courses and publication of standards manuals and guide books.

EMC and product safety testing activities

KEC has laboratory accreditation based on ISO/IEC 17025 accredited by a third-party accreditation body, which is a standard indicating the ability of test facilities to generate accurate test results.
KEC is also certified as a proficiency test provider based on ISO/IEC 17043.
KEC's well-equipped facilities and equipment provide EMC and product safety test required for client product development.

Activities of Committee

KEC responses to demands from the electronics industry by promoting research and investigation, information sharing, and resource development supported by strong collaboration among industry, academia and government.

KEC seminar

iNARTE certification exam (in Tokyo, Nagoya and Osaka)

iNARTE qualification certificates

iNARTE EMC certificate

iNARTE PS certificate

KEC/iNARTE EMC design engineer certificate

Expert committee on Reserch

KEC contributes to the improvement of the technological capabilities of the industry and the creation of new businesses in companies by conducting surveys of advanced and applied technologies, providing information through seminars and forums, and holding technical courses.

Intellectual property subcommittee

Trend research, information supply, judicial precedent study and report regarding intellectual property rights

Next-generation wireless technology course

One-year curriculum guided by experienced expert, covering from basic to advanced knowledge of wireless technology

KEC seminar planning working group

Planning and holding “KEC seminars” to share insights from research on leading and emerging technologies that are gaining attention of the community and industry

Working group for planning convergence of optical and radio-wave technologies

Planning activities and sharing current information of relevant technologies to create new technology fields by converging optical and radio-wave technologies

Expert committee on iNARTE Japan

Personnel certification for EMC and product safety (PS) certified by iNARTE (currently known as Exemplar Global Inc.) in the United States can assure the technology level of not only the certified person but also the organization where he or she belongs. KEC has partnered with iNARTE to be able to take the exam in Japanese in Japan, and this committee supports this activity.

iNARTE/J EMC subcommittee

Encouraging acquisition of EMC engineer/technician certificate, providing necessary education, and administering exams

iNARTE/J PS subcommittee

Encouraging acquisition of PS engineer/technician certificate, providing necessary education, and administering exams

* iNARTE: The International Association for Radio, Telecommunications and Electromagnetics

Expert committee on Promoting EMC design engineer certification

The technical level of “EMC design” in the product development phase is evaluated for “EMC design engineer certification”. KEC together with iNARTE has established and administers this certification scheme. The committee supports this activity.

Expert committee on EMC

To contribute to the industry, the committee promotes research and investigation on common EMC-related problems in the field, translation of standards, sharing of information about leading technologies, and participation in technical courses.

Study group

Planning and managing working groups for building technologies to experiment and verify concepts of new standards and improve measurement accuracy, conducting research on standards applicable to products equipped with new technologies, and conducting round-robin evaluations, etc.

Research and publication group

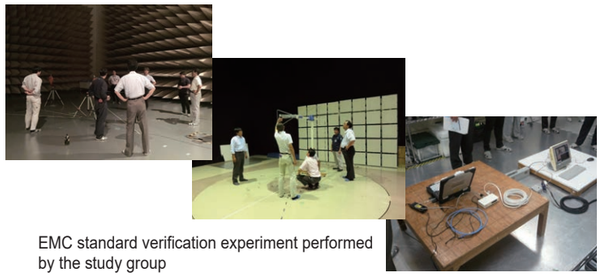
Planning and managing working groups by country or subject for research on foreign EMC standards and trend of enforcement of such standards, understanding of standards, and research and translation of measurement technologies. Work products are published for sharing.

EMC technical course for designers

Practical education course for designing and manufacturing products in consideration of EMC

EMC Kansai planning working group

Planning and holding “EMC Kansai” seminars, which are a place for talking on leading technologies, trend, and common issues related to EMC and exchanging technical information



EMC standard verification experiment performed by the study group

Practice of the EMC technical course for designers

Translation of EMC standards such as IEEE, FCC, MIL, and ETSI
Publication of IEC safety standard guidebook

Expert committee on Product safety

The committee aims to contribute to delivery of safe and reliable products by conducting research, collection, provision, translation and explanation of information about product safety standards and technologies while improving product safety technologies and reliability in the industry and training product safety engineers.

Safety standard subcommittee

Research and analysis on the trend and content of domestic and foreign product safety standards, and translation and publication of foreign standards as necessary

Reliability subcommittee

Research and investigation on how to ensure reliability and safety with focus on the failure mechanism at the end of lifetime of products

Safety technology subcommittee

Research and investigation on new technologies for product safety such as functional safety, hazard-based safety engineering, and risk assessment

Seminar on reliability

Activities on EMC and Product Safety Test

iNARTE-certified engineers support EMC and product safety tests according to international and various standards.


Testing facility certificates

How testing is performed

Features of the KEC testing center

KEC has a full range of test facilities such as large/small anechoic chamber and shield rooms.
Our testing facilities have been accredited under ISO/IEC 17025 and support EMC testing of a wide range of products, for example automotive devices to be certified by A2LA (American Association For Laboratory Accreditation), MIL standard compliant and aircraft devices to be certified by JAB (Japan Accreditation Board), and IT, consumer, medical, transmitter/receiver, industrial, and railway-related devices to be certified by VLAC (Voluntary EMC Laboratory Accreditation Center).

Type of test and facility utilization

Compliance EMC test

KEC performs EMC tests (including witness tests) based on ISO/IEC 17025 accreditation and submit test reports.

Pre-EMC test

Clients measure their own test samples by themselves using the facilities of KEC.

Commissioned Pre-EMC test

KEC staff perform testing on a test sample brought by customers.

Product safety test

KEC conducts product safety tests of electric/electronic equipment based on domestic and overseas standards. KEC also carries out engineering consultation with clients.

Application Proxy Services

With VLAC accreditation based on ISO/IEC17025, KEC conduct tests for device approval (certification) of transmitters for North America and NB verification of radio equipment for Europe, as proxy service.
For product safety testing, KEC is registered as a registered laboratory based on the S-JQA mark system of JQA (Japan Quality Assurance Organization), and KEC allows to executes application of domestic S marking acquisition.

On-site measurement service

On-site measurement of large-size equipment

For large-size equipment installed for example in factories, if it is difficult to transport to or accommodate in the anechoic chamber of KEC, KEC staff travel to a place where the equipment is installed, such as in a factory, to perform measurements.

Electromagnetic environment study and assessment

KEC surveys and evaluates electromagnetic environment in premises of factories, offices etc.

Characterization test on EMC testing facilities

KEC staff evaluate characteristics of client's EMC test facility.

Facilities

KEC promptly provides with high-quality test by using the latest EMC test facilities.

List of testing facilities

Facility	Test item
Anechoic chamber No. 1	Radiated disturbance measurement (3 m/10 m) Radiated electromagnetic field immunity test on small and large-size equipment
Anechoic chamber No. 2	Radiated electromagnetic field immunity test on small-size equipment
Anechoic chamber No. 3	Radiated disturbance measurement (3 m)
Anechoic chamber No. 6	Electrostatic discharge (ESD) test; EFT/B test Lightning surge test Conducted disturbance immunity test Power frequency magnetic field immunity test
Anechoic chamber No. 7	Various types of EMC tests for automotive components, aircraft devices, and MIL standard compliant devices
Anechoic chamber No. 8	
Anechoic chamber No. 9	
Anechoic chamber No. 10	Radiated disturbance measurement (3 m/10 m) Radiated electromagnetic field immunity test on small and large-size equipment Antenna characterization
Anechoic chamber No. 11	Radiated disturbance measurement (3 m) Radiated electromagnetic field immunity test on small-size equipment Noise power measurement (with absorbing clamp) Radiated disturbance measurement (3 m) in CISPR 32 compliant FAR
Anechoic chamber No. 12	Various types of EMC test on component for automotive devices
Anechoic chamber No. 13	
Anechoic chamber No. 14	Radiated disturbance measurement (3 m) Disturbance power measurement (with absorbing clamp) Radiated electromagnetic field immunity test on small-size equipment
Shielded room No. 1	Conducted disturbance measurement Electrostatic discharge (ESD) test EFT/B test; lightning surge test Conducted immunity test Power frequency magnetic field immunity test
Shielded room No. 7	Component for automotive transient test (ISO 7637-2 and 3) Component for automotive electrostatic discharge (ESD) test (ISO 10605)
Shielded room No. 8	TEMCELL test (ISO 11452-3) BCI immunity test (ISO 11452-4)
Shielded room No. 9	Conducted disturbance measurement Broadcast receiver immunity test Electrostatic discharge (ESD) test; EFT/B test Lightning surge test Conducted disturbance immunity test Power frequency magnetic field immunity test
Shielded room No. 10	
Harmonic current emission testing room	Harmonic current emission test Voltage fluctuation and flicker test Voltage dips, short interruptions and voltage variations immunity test
Shielding material testing room	Shielding performance measurement with KEC method (500 Hz to 1 GHz) Shielding performance measurement with GHz KEC method (1 GHz to 6 GHz)
Evaluation testing room	Various types of transient voltage surge tests for automotive components
Safety testing room	Product safety test on domestic and international standards and company-specific rules

Head office and Keihanna testing center

Anechoic chamber building at the Keihanna testing center

Ikoma testing site No. 1

Ikoma testing site No. 2

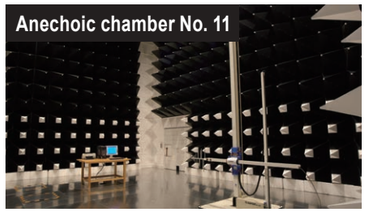
Applicable Product Items and Test Facilities

KEC supports wide-range of product tests from consumer, industrial, radio equipment and medical devices to components for Automotive, Aircraft and Military using the latest test facilities.

Consumer, industrial, radio equipment and medical devices


Anechoic chamber No. 1


Anechoic chamber No. 10


Anechoic chamber No. 11


Anechoic chamber No. 14

Applicable standards

FCC (U.S.)
Part 15 Digital devices, and radio frequency devices
Part 18 Industrial, scientific, and medical equipment
Part 22 Public mobile services
Part 90 Private land mobile radio services
Part 95 Radio control radio services, CB radio services, etc.

Innovation, Science and Economic Development Canada
BETS-7, ICES-001, 002, 003, 005, RSS-210, etc.

CENELEC (Europe)
EN 55011 to EN 55032,
EN 61000-3-2/12, EN 61000-3-3/11
EN 61000-6-1, 2, 3, 4, 7

ETSI (Europe)
EN 300 200, EN 300 328, EN 300 330, EN 301893, etc.
EN 301489-1, 3, 9, 17

CISPR (International)
CISPR 11, 12, 13, 14, 15, 20, 22, 24, 25, 32, 35
(ISM, broadcast receivers, household appliances, lighting equipment, information technology equipment, and multimedia equipment)

IEC (International)
IEC 61000-4-2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 16, 18, 29, 34
IEC 61000-6-1, 2, 3, 4, 7

VCCI (Japan)
VCCI technical standard for information technology equipment

Radio Law (Japan)
Extremely low power radio stations, and equipment utilizing high frequency (40 GHz)

Electrical Appliance and Material Safety Act (Japan)
Household appliances, broadcast receivers and related equipment

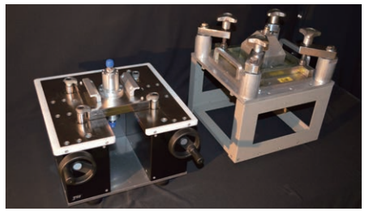
EV/PHEV charging system
IEC 61851-21, -22

Power conditioner (solar energy, etc.)
IEC 62920

Railway and related industries
IEC 62236-3-2, IEC 62236-4,
EN 50121-3-2, EN 50121-4

Marine equipment
IEC 60945, JIS F 0808, ClassNK guidance (Materials and equipment for marine use), Part 7, Chapter 1 (Automatic devices and equipment)

Shielding material test



Measurement and evaluation of electromagnetic shielding performance
KEC method Applicable frequency range: 500 Hz to 1 GHz
GHz KEC method Applicable frequency range: 1 GHz to 6 GHz

EMC proficiency test (by interlaboratory comparison)

KEC provides EMC proficiency tests based on JIS Q 17043: 2011 (general requirements for proficiency tests).
- Radiated emission measurement under CISPR 16-2-3 (30 MHz to 1 GHz: measurement distance 3 m/10 m)
- Radiated emission measurement under CISPR 16-2-3 (1 GHz to 6 GHz: measurement distance 3 m)
- Conducted emission measurement under CISPR 25 (2016), Sections 6.3 and 6.4
- Measurement of conducted disturbance at telecommunication ports (AAN method) under CISPR 16-2-1 and CISPR 32 (150 kHz to 30 MHz)
- Measurement of conducted disturbance at AC power ports (AMN method) under CISPR 16-2-1 (150 kHz to 30 MHz)

Components for automotive, aircraft, and MIL standard

Applicable standards

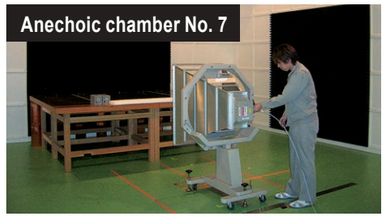
CISPR
CISPR 25 Emission measurement

ISO
ISO 11452-2 Radiated immunity test
ISO 11452-3 TEMCELL immunity test
ISO 11452-4 BCI immunity test
ISO 11452-5 Stripline immunity test
ISO 11452-8 Magnetic field immunity test
ISO 11452-9 Portable transmitter immunity test
ISO 11452-10 Conducted immunity test in the audio frequency range
ISO 10605 ESD test for automotive components
ISO 7637-2, 3 Surge immunity/emission test for automotive components

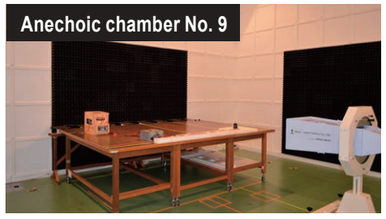
Foreign automotive manufacturer specification
Radar pulse immunity test (600 V/m)

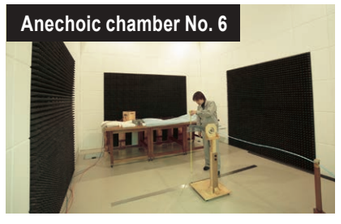
MIL (MIL-STD-461)
Electric and electronic devices on aircraft, ship, etc.

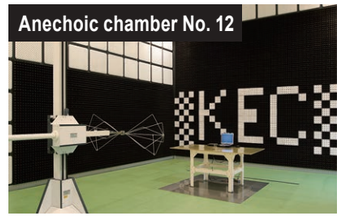
RTCA/DO-160
EMC test for devices on U.S. commercial aircraft


Anechoic chamber No. 7


Anechoic chamber No. 8


Anechoic chamber No. 9


Anechoic chamber No. 6



Anechoic chamber No. 12


Anechoic chamber No. 13

Product safety test

Applicable standards

Electrical Appliance and Material Safety Act (Japan)
Technical Standards (Appended Tables 8 and 12)

CENELEC (Europe), CE marking compliant (low voltage/RE directive)
IEC/EN 60065 Audio, video and similar electronic apparatus
IEC/EN 60950-1 Information technology equipment

S-mark certification test
Products in the scope of S-mark (S-JQA): Cooling/exhaust fan and audio and video apparatus


Safety testing room