VCCI DAYORI

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Contents

Contribution

Noise problems in IC chips, IoT devices, and ICT systems

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At the VCCI Technical Symposium on January 18, 2019 (Fri), I was given the opportunity to speak about the Evaluation of Unnecessary Radio Waves from Iot Devices and Their Countermeasures. Generally speaking, IoT devices can be used for many functions, for example as power supplies, telecommunications devices, and control devices. Degrading radio communication performance caused by unnecessary radio-wave interference inside equipment poses a serious problem, particularly for the purposes of remote information collection and control. Attempts have been made to resolve this problem through multi-layered (from the perspectives of the simulation, packaging, electromagnetic environment compatibility, and other fields) integration of research initiatives in different areas. These areas include the emission and evaluation of unnecessary radio waves in (IC) chips in semiconductor integrated circuits, techniques for simulating unnecessary radio-wave interference and telecommunications performance (such as for mobile communications), and techniques to address unnecessary radio waves applied to magnetic fine particles. An example of such attempts is the research topic of the R&D system for expanding radio wave resources (Ministry of Internal Affairs and Communications), "R&D on techniques to improve radio wave environments to expand the bandwidth of unnecessary radio waves (FY 2015 - 2018)". Tohoku University, Kobe University, TOKIN Corporation, and Showa Aircraft Industry Co., Ltd have promoted research on this topic through close collaboration between industry and academia.

I have been researching noise issues in semiconductor IC chips for almost 25 years. In the 1990s and 2000s, researchers were studying noise interference between analog and digital circuits in system-on-a-chip integration. There was demand for research on noise minimization techniques using circuit designs incorporating considerations such as the physical structure of semiconductor devices, the physical layout of IC chips, and noise. From the 2010s, noise interference in systems applying IC chips became a central problem. There was growing interest in noise simulations on physical systems integrating IC chips, packages, and printed circuit boards, simulations on noise on the IC-chip level and interference in telecommunications systems, and interactions between IC chip operations and electromagnetic noise. That is, these subjects began to verge on the scope of interest of many people involved in VCCI Council. In the future, I expect these people to engage with noise problems in information and communications technology (ICT) on a wider scale.

During the aforementioned R&D activities, evaluations were made on the emission of unnecessary radio waves near wireless power transfer (WPT) systems for automobiles, and the potential for interference by LTE mobile communications. Here, the main sources emitting unnecessary radio waves were switching power supply modules and digital control modules using semiconductor elements. Near-system observations of electric current consumed by cyclic switching operations of semiconductor circuits have recorded a higher-

harmonic noise equivalent to ten times, or even dozens of times that of basic operating frequency. Simulations on mobile communications systems have found that superimposing some of these noise components on the received bandwidth of LTE receivers might degrade reception sensitivity. Through such system-level noise evaluation methods, the effectiveness of noise suppression sheets (magnetic material technologies) and the like can be quantified not only as a reduction in noise emissions in WPT devices, but also as "noise resistance". This noise resistance is arrived at using communications performance in mobile communications devices as an indicator. This has enabled us to more specifically consider the costs and trade-offs of noise minimization.

Noise problems in IC chips also appear in the ICT (upper) information layer. Side-channel information leaks from encryption modules supporting the secrecy and authenticity of digital information are a known threat to the security functions of IoT devices. Putting encryption algorithms on IC chips via semiconductor technology enables small-scale, low-energy, and highly efficient use of IoT devices. Encryption algorithms are mathematically and cryptographically robust, and it is extremely difficult to decrypt the digital I/O data of IC chips. However, internal information such as private keys can sometimes be surmised from natural emissions of electromagnetic waves during IC chip operation, or by analyzing responses to deliberate injections of electromagnetic waves (immunity). Such information leaks from secure devices via unauthorized data channels (side channels) are an engineering challenge, and there is ongoing research on solutions that combine our knowledge about IC chip noise with expertise in the encryption field.

In this way, the experience and knowledge gained from research on noise in IC chips is being incorporated extensively in anti-noise initiatives in ICT systems. At the VCCI Technical Symposium, I talked about the need to articulate research policies on modern systems employing advanced technological integration as topics of great social interest. We also need to employ a strategy of attracting young students to the VLSI-field and EMC-field research laboratories without strongly emphasizing traditional technology fields. Our research team named "Secafy" (coined from the phrase "hardware security and safety"; see the following logo) works on multifaceted, multi-layered research activities focusing on hardware security and safety. I would like to close this article by inviting all VCCI Council associates to offer their advice and encouragement on this matter going forward.

Hardware Security and Safety
Secafy
Kobe University

Makoto Nagata

1993 Completed a Master of Physics at the Gakushuin University Graduate School of Science
1994 Worked on a Doctorate in Materials Engineering at Hiroshima University Graduate School of Engineering and was appointed Associate Professor at Hiroshima University
2002 Associate Professor at Kobe University
2009 Professor at Kobe University
Present Professor at Kobe University Graduate School of Science, Technology and Innovation
Won a Technology Award from the Japan Institute of Electronics Packaging (FY 2009)
Won an Electronics Society Award from the Institute of Electronics, Information and Communication Engineers (FY 2014)
He is now engaged in R&D on general noise problems and security in VLSI hardware.

Committee Activities

● Board of Directors

Date	March 28, 2019
Agenda items	● Agenda item 1 FY 2019 business plan ● Agenda item 2 FY 2019 budget
Decisions and reported items	● Agenda item 1 Approved ● Agenda item 2 Approved ● Reported item 1 On the end of the "combination period" of the rules for applying self-imposed restrictive measures ● Reported item 2 On EMC Sapporo & APEMC 2019

● Steering Committee

Date	February 20, March 22, April 23, 2019
Agenda items	● Agenda item 1 Discuss the FY 2019 business plan ● Agenda item 2 Discuss the budget proposal for FY 2019 ● Agenda item 3 Guidelines on calibration management, such as for measurement facilities (draft) ● Agenda item 4 Select the chairman of the Steering Committee ● Agenda item 5 Select the chairmen of the Technical Subcommittee and Public Relations Subcommittee ● Agenda item 6 New members from January through March
Continuing agenda items	● Agenda item 2
Decisions and reported items	● Agenda item 1 Approved ● Agenda item 3 Approved ● Agenda item 4 Approved ● Agenda item 6 Approved ● Reported item 1 Activity reports for the period from January to March were made by the dedicated subcommittees (Technical, International Relations, Market Sampling Test, Education, Public Relations) ● Reported item 2 Status report regarding secretariat work (member entry and withdrawal trends, the number of compliance verification reports, income and expenditure, etc.) ● Reported item 3 2019 Rules Briefing and Technical Symposium ● Reported item 4 On EMC Sapporo & APEMC 2019 ● Reported item 5 VCCI seminar (Sendai, Kyoto) (see pages 15 and 16)

● Technical Subcommittee

Date	March 15, 2019
Agenda items	● Agenda item 1 On the Technical Subcommittee's past activities for FY 2018 ● Agenda item 2 On the Technical Subcommittee's planned activities for FY 2019 ● Agenda item 3 On the CD documents submitted at the CISPR Sydney conference ● Agenda item 4 On two contributed documents submitted at the CISPR Singapore conference Result of considering improvements to the impact on measurements of CVP and CP combined, when CMAD is inserted between AEs Result of considering creating the RRT procedure document about power cable termination conditions ● Agenda item 5 On EMC Sapporo & APEMC 2019 Tutorial ● Agenda item 6 On considerations of calibration using free-space antenna factor
Continuing agenda items	● Agenda item 2 ● Agenda item 3 ● Agenda item 4 ● Agenda item 5 ● Agenda item 6
Decisions and reported items	● Agenda item 1 Report on the 2019 Rule Briefing and Technical Symposium held on January 18

● International Relations Subcommittee

Date	January 11, February 8, March 14, 2019
Agenda items	● Agenda item 1 Overseas survey ● Agenda item 2 Survey on trends in world EMC standards ● Agenda item 3 International Forum ● Agenda item 4 Database of standards information
Continuing agenda items	● Agenda item 3 ● Agenda item 4
Decisions and reported items	● Agenda item 1 We visited Vietnam MIC and Indonesia SDPPI as part of the March 2019 overseas survey. A report on these meetings will first be released to VCCI website members, then in the world EMC standards survey, and finally in the EMC survey report (and in the next issue of VCCI DAYORI). ● Agenda item 2 The leader and countries in charge were decided for the survey on trends in world EMC standards, which is updated annually. This information is planned for release on the website at the end of June. ● Agenda item 3 The FY 2019 International Forum will be held on October 18 (Fri) at the CEATEC JAPAN venue (Makuhari Messe).

● Market Sampling Test Subcommittee

Date	February 6, March 14, April 11, 2019
Agenda items	● Agenda item 1 Document inspection ● Agenda item 2 Action on "Failed" cases ● Agenda item 3 Summary of the FY 2018 market sampling test ● Agenda item 4 Report on surveys on the display of the VCCI mark ● Agenda item 5 FY 2019 selection policy ● Agenda item 6 Document forms
Continuing agenda items	● Agenda item 5 The FY 2019 market sampling test adopted the policies of last fiscal year. The committee will consider key fields in the future. ● Agenda item 6 We are considering revisions to the implementation status sheets for market sampling tests.
Decisions and reported items	● Agenda item 1 The 9 remaining document inspections for FY 2018 were performed, all of which found no problems. ● Agenda item 2 In FY 2018, 2 products failed to meet the standards, but when the test was restructured to reflect the HDMI cable specifications by members and normal usage conditions, both of these products passed. ● Agenda item 3 100 tests were completed, and 0 products failed to meet the standards. 41 document inspections were completed, 39 of which found no problems, and 2 of which found problems, which were corrected. ● Agenda item 4 The FY 2018 survey results were reported. A total of 1787 products were surveyed, 1373 of which were member products (77%), and 414 of which were non-member products (23%).

● Education Subcommittee

Date	February 26, March 15, April 26, 2019
Agenda items	● Agenda item 1 On education and training held in FY 2018 ● Agenda item 2 On education and training to be held in FY 2019 ● Agenda item 3 On revisions and considerations regarding textbooks for education and training planned for FY 2019
Continuing agenda items	● Agenda item 3
Decisions and reported items	● Agenda item 1 - The first EMI measurement instrument uncertainty (MIU) class was held on February 1, with 24 attendees. Questionnaires submitted by attendees showed satisfaction with the class. - In FY 2018, 5 classes were held, with 143 attendees (counting repeat attendees). In FY 2018 in particular, 5 classes have been held (3 of which were revised, 1 of which was updated, and one of which was new), and revisions to comply with CISPR32 technical standards are complete. ● Agenda item 2 5 classes are planned for FY 2019, and yearly schedules are published on the website. The following classes are also planned: - Basic EMI measurement techniques - Basics of electromagnetic waves and measurement techniques for EMI of 1 GHz or less - Measurement techniques for EMI exceeding 1 GHz - Upgrading EMI measurement technology - EMI measurement instrument uncertainty (MIU) ● Agenda item 3 Brush up classroom lectures, self-study textbooks, and self-study procedures based on questionnaire results from FY 2018 classes and newly issued guidelines ● Reported item 1 Status of education and training held in FY 2019 - The 39th class on basic EMI measurement techniques was held on April 26, with 25 attendees.

● Public Relations Subcommittee

Date	March 15, 2019
Agenda items	● Agenda item 1 On Techno-frontier 2019 ● Agenda item 2 On EMC Sapporo & APEMC 2019 ● Agenda item 3 On the Chinese version of distributed materials (both simplified and traditional characters) ● Agenda item 4 On novelty goods
Continuing agenda items	● Agenda item 2 ● Agenda item 3
Decisions and reported items	● Agenda item 1 We checked information on the exhibitions at Techno-frontier 2019, which was held in April. ● Agenda item 3 We completed the Chinese translation of the three-fold VCCI introductory pamphlet. The secretariat reported that in FY 2019, other distributed materials are also to be translated to Chinese. These will be distributed at future exhibitions and symposiums in China and Taiwan. ● Agenda item 4 The secretariat reported that novelty goods for distribution at exhibitions and the like from FY 2019 onward have been completed.

● Measurement Facility Registration Committee

Date	February 18, 2019
Agenda items	● Reviewed the results of deliberations by the Measurement Facility Examination WG and concluded as follows
Decisions	Conformity certified (including cases certified with qualification comments after extra document checks) 34 companies Radiated EMI measurement facilities 15 Mains ports conducted EMI measuring facilities 15 Telecommunication port conducted EMI measuring facilities 14 Radiated EMI measurement facilities above 1GHz 14 Applications returned with comments None Applications carried over to the next meeting None
Date	March 18, 2019
Agenda items	● Reviewed the results of deliberations by the Measurement Facility Examination WG and concluded as follows
Decisions	Conformity certified (including cases certified with qualification comments after extra document checks) 17 companies Radiated EMI measurement facilities 10 Mains ports conducted EMI measuring facilities 11 Telecommunication port conducted EMI measuring facilities 10 Radiated EMI measurement facilities above 1GHz 14 Applications returned with comments None Applications carried over to the next meeting None
Date	April 22, 2018
Agenda items	● Reviewed the results of deliberations by the Measurement Facility Examination WG and concluded as follows
Decisions	Conformity certified (including cases certified with qualification comments after extra document checks) 28 companies Radiated EMI measurement facilities 20 Mains ports conducted EMI measuring facilities 11 Telecommunication port conducted EMI measuring facilities 7 Radiated EMI measurement facilities above 1GHz 14 Applications returned with comments None Applications carried over to the next meeting None

●Report on Committee Activities: List of Acronyms

Abbreviation	Full Name
AAN	Asymmetric Artificial Network
AMN	Artificial Mains Network
ANSI	American National Standards Institute
APD	Amplitude Probability Distribution
APLAC	Asia Pacific Laboratory Accreditation Corporation
AQSIQ	General Administration of Quality Supervision , Inspection and Quarantine of the People's Republic of China
BSMI	Bureau of Standards, Metrology and Inspection
CALTS	Calibration Test Site
CB	Certification Body
CB	Competent Body
CCC	China Compulsory Product Certification
CD	Committee Draft
CDN	Coupling Decoupling Network
CDNE	Coupling Decoupling Network for Emission
CDV	Committee Draft for Vote
CEMC	China Certification Center for Electromagnetic Compatibility
CEN	European Committee for Standardization
CENELEC	European Committee for Electro Technical Standardization
CISPR	International Special Committee on Radio Interference
CMAD	Common Mode Absorbing Device
CQC	China Quality Certification Center
CSA	Classical (Conventional) Site Attenuation
CSA	Canadian Standards Association
DAF	Dual Antenna Factor
DC	Document for Comment
DoC	Declaration of Conformity
DOW	Date of Withdrawal
DTI	Department of Trade and Industry
DUT	Device Under Test
ECANB	EC Association of Notified Bodies
Ecma	Ecma International
EICTA	European Information, Communications and Consumer Electronics Technology Industry Association
EMCC	Electro Magnetic Compability Conference
EMCAB	Electromagnetic Compatibility Advisory Bulletin
EMF	Electromagnetic Field
EMF	Electromotive Force
ETSI	European Telecommunication Standards Institute
EUANB	European Union Association of Notified Bodies
EUT	Equipment Under Test
FAR	Fully Anechoic Room
FDIS	Final Draft International Standard
GB	guo jia biao zhun（National Standard of China）
GSO	Gulf Cooperation Council Standardization Organization
ICES	Interference-Causing Equipment Standards
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IS	International Standard
ISM	Industrial Scientific and Medical
ITE	Information Technology Equipment
LCL	Longitudinal Conversion Loss
MIC	Ministry of Information and Communication
MME	Multimedia Equipment
MOU	Memorandum of Understanding
MP（法）	Magnetic Probe

Abbreviation	Full Name
MRA	Mutual Recognition Agreement/Arrangement
NCB	National Certification Body
NICT	National Institute of Information and Communications Technology
NIST	National Institute of Standards and Technology
NP	New Work Item Proposal
NSA	Normalized Site Attenuation
OFDM	Orthogonal Frequency Division Multiplex
PAS	Publicly Available Specification
PLT	Power Line Telecommunication
R&TTE	Radio & Telecommunications Terminal Equipment
RBW	Resolution Band Width
REF	Reference
RRA	Radio Research Agency
RRT	Round Robin Test
RSM	Reference Site Method
RVC	Reverberation Chamber
SAC	Semi Anechoic Chamber
SDPPI	Semangat Disiplin Profesional Procuktif Integritas
S/N	Signal to Noise ratio
TF	Task Force
TG	Tracking Generator
UPS	Uninterruptible Power Supply
VBW	Video Band Width
VHF-LISN	Very High Frequency-Line Impedance Stabilization Network
VSWR	Voltage Standing Wave Ratio
WG	Working Group
WP	Working Party

17th instalment

EMC Standard of IEC 61000-4 (Testing and Measurement Techniques) Series Developed by TC77

Masamitsu Tokuda

1. Foreword

TC77 (77th EMC standards subcommittee) of the IEC (International Electrotechnical Commission) have been tasked with defining standards in the IEC 61000 series, consisting of part 1 (general) through part 9 (miscellaneous)[1-6].

This instalment introduces the standards specified by the IEC 61000-4 series relating to immunity testing and emissions measurements.

2. Standards of the IEC 61000-4 (testing and measurement techniques) series

As shown in Table 1, the standards of the IEC 61000-4 (testing and measurement techniques) series are being developed by the subcommittees of SC77A (low-frequency phenomena), SC77B (high-frequency phenomena) and SC77C (transient phenomena in high-power electromagnetic fields), each of which develop international standards for their respective positions. Because the parent committee, TC77, is responsible for the overarching rules of the IEC 61000-4 series, TC77 is developing IEC TR 61000-4-1. Some of these international standards already exist as standards in Japan, for example in the JIS (Japanese Industrial Standards) or TR (Technical Report), so information on these Japanese standards is also shown in Table 1. While immunity testing involves a large number of testing items, the immunity testing cited in common standards for immunity such as IEC 61000-6-1 (residential, commercial, and light-industrial environments) or IEC 61000-6-2 (industrial environments) is usually incorporated in JIS. Among the names of standards shown in Table 1, those found in Japanese standards such as JIS or TR are shown under their Japanese standard names. Those that are not found in Japanese standards are shown under names translated from the English names of the international standards. Note that names found in Japanese standards such as JIS or TR might differ slightly from the international standard names.

The standards of the IEC 61000-4 series developed by SC77A include immunity testing for power frequency magnetic fields (4-8) and voltage dips, short-term power outages, and voltage fluctuations (4-11: input current of 16 A or less) (4-34: input current of more than 16 A) cited in the common standards for immunity. All international standards have also been incorporated in JIS. Aside from these, there is immunity testing for conducted, common mode interference from DC up to 150 kHz (4-16), voltage fluctuations (4-14), and ripple in DC input power terminals (4-17), which are also incorporated in JIS. However, 4-14 and 4-17 were abolished by JIS in 2017. There is immunity testing that has not been incorporated in JIS, for power harmonics (4-13), differential mode interference in mains ports from 2 kHz to 150 kHz (4-19), asymmetry (4-27), power frequency fluctuations (4-28), voltage dips in DC terminals, short-term power outages, and voltage fluctuations (4-29), and more. Meanwhile, there are low-

frequency emissions measurements for power-frequency harmonics (4-7) and flicker (4-15), of which harmonics (4-7) is incorporated in JIS. There are also standards for methods for measuring power quality (4-30). In addition, there are standards for harmonic emissions (4-37) and voltage fluctuations and flicker (4-38), which provide procedures for calibrating and inspecting compliance testing systems.

Table 1 Standards of the IEC 61000-4 (testing and measurement techniques) series developed by TC77 (Part 1) (as of January 2019)

International Standard (Latest Version) (Creator Organization)	Name of Standard	Domestic JIS Domestic TR (and Corresponding International Standard)	Year and Month of Establishment, Revision, Verification, or Abolishment
IEC TR 61000-4-1 [Ed.1.0: 16-04] (TC77)	Electromagnetic compatibility (EMC) - Part 4-1: Testing and measurement techniques - IEC 61000-4 series overview	—	—
IEC 61000-4-2 [Ed.2.0: 08-12] (SC77B)	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Immunity testing for static electricity discharges	JIS C 61000-4-2:2012 [IEC 61000-4-2:2008] (IDT)	Established: 99-02 Revised: 12-06 Verified: 17-10
IEC 61000-4-3 [Ed.3.2: 10-04] (SC77B)	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Immunity testing for emitted radio-frequency electromagnetic fields	JIS C 61000-4-3:2012 [IEC 61000-4-3:2010] (IDT)	Established: 97-11 Revised: 12-03 Verified: 16-10
IEC 61000-4-4 [Ed.3.0: 12-04] (SC77B)	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Immunity testing methods for electrical fast transient bursts	JIS C 61000-4-4:2015 [IEC 61000-4-4:2012] (IDT)	Established: 99-02 Revised: 15-10
IEC 61000-4-5 [Ed.3.1: 17-08] (SC77B)	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Immunity testing methods for surges	JIS C 61000-4-5:2018 [IEC 61000-4-5:2014] (IDT)	Established: 99-02 Revised: 18-03
IEC 61000-4-6 [Ed.4.0: 13-10] (SC77B)	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity testing for conducted interference inducted by radio-frequency electromagnetic fields	JIS C 61000-4-6:2017 [IEC 61000-4-6:2013] (IDT)	Established: 99-02 Revised: 17-03
IEC 61000-4-7 [Ed.2.1: 09-10] (SC77A)	Electromagnetic compatibility (EMC) - Part 4-7: Testing and measurement techniques - Methods for measuring harmonics and interharmonics and instrument-related indicators for power supply systems and their connected devices	JIS C 61000-4-7:2007 [IEC 61000-4-7:2002] (IDT)	Established: 97-11 Revised: 07-05 Verified: 17-10
IEC 61000-4-8 [Ed.2.0: 09-09] (SC77A)	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Immunity testing for power frequency magnetic fields	JIS C 61000-4-8:2016 [IEC 61000-4-8:2009] (IDT)	Established: 03-03 Revised: 16-01
IEC 61000-4-9 [Ed.2.0: 16-07] (SC77B)	Electromagnetic compatibility (EMC) - Part 4-9: Testing and measurement techniques - Immunity testing for pulse magnetic fields	—	—
IEC 61000-4-10 [Ed.2.0: 16-07] (SC77B)	Electromagnetic compatibility (EMC) - Part 4-10: Testing and measurement techniques - Immunity testing for damped oscillatory wave magnetic fields	—	—
IEC 61000-4-11 (Ed.2.1: 17-05) (SC77A)	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Immunity testing for voltage dips, short-term power outages, and voltage fluctuations	JIS C 61000-4-11:2008 [IEC 61000-4-11:2004] (IDT)	Established: 03-03 Revised: 08-03 Verified: 17-10

IDT (Identical), MOD (Modified)

Table 1 Standards of the IEC 61000-4 (testing and measurement techniques) series developed by TC77 (Part 2) (as of January 2019)

International Standard (Latest Version) (Creator Organization)	Name of Standard	Domestic JIS Domestic TR (and Corresponding International Standard)	Year and Month of Establishment, Revision, Verification, or Abolishment
IEC 61000-4-12 [Ed.3.0: 17-07] (SC77B)	Electromagnetic compatibility (EMC) - Part 4-12: Testing and measurement techniques - Immunity testing for ring waves	—	—
IEC 61000-4-13 [Ed.1.2: 15-12] (SC77A)	Electromagnetic compatibility (EMC) - Part 4-13: Testing and measurement techniques - Immunity testing for power harmonics and interharmonics for AC ports (including power-line carriers)	—	—
IEC 61000-4-14 (Ed.1.2: 09-08) (SC77A)	Electromagnetic compatibility (EMC) - Part 4-14: Testing and measurement techniques - Immunity testing for voltage fluctuations	JIS C 61000-4-14:2004 [IEC 61000-4-14:1999] (MOD)	Established: 04-03 Verified: 08-10 Abolished: 17-03
IEC 61000-4-15 [Ed.2.0: 10-08] (SC77A)	Electromagnetic compatibility (EMC) - Part 4-15: Testing and measurement techniques - Flicker meter function and design specifications	—	—
EC 61000-4-16 [Ed.2.0: 15-12] (SC77A)	Electromagnetic compatibility (EMC) - Part 4-16: Testing and measurement techniques - Immunity testing for conducted, common mode interference from DC up to 150 kHz	JIS C 61000-4-16:2017 [IEC 61000-4-16:2015] (IDT)	Established: 04-03 Revised: 17-03
IEC 61000-4-17 [Ed.1.2: 09-01] (SC77A)	Electromagnetic compatibility (EMC) - Part 4-17: Testing and measurement techniques - Immunity testing for ripple in DC input power terminals	JIS C 61000-4-17:2004 [IEC 61000-4-17:1999] (IDT)	Established: 04-03 Verified: 08-10 Abolished: 17-03
IEC 61000-4-18 [Ed.1.1: 11-03] (SC77B)	Electromagnetic compatibility (EMC) - Part 4-18: Testing and measurement techniques - Immunity testing for damped oscillatory waves	—	—
IEC 61000-4-19 [Ed.1.0: 14-05] (SC77A)	Electromagnetic compatibility (EMC) - Part 4-19: Testing and measurement techniques - Immunity testing for conducted, differential mode interference in AC mains ports of frequencies 2 kHz to 150 kHz	—	—
IEC 61000-4-20 [Ed.2.0: 10-08] (SC77B&CIS/A)	Electromagnetic compatibility (EMC) - Part 4-20: Testing and measurement techniques - Methods of emissions testing and immunity testing using TEM (transverse electromagnetic field) waveguides	JIS C 61000-4-20:2014 [IEC 61000-4-20:2010] (MOD)	Established: 06-04 Revised: 14-02 Verified: 18-10
IEC 61000-4-21 [Ed.2.0: 11-01] (SC77B&CIS/A)	Electromagnetic compatibility (EMC) - Part 4-21: Testing and measurement techniques - Testing methods using reverberation chambers	—	—
IEC 61000-4-22 (Ed.1.0: 10-10) (CIS/A&SC77B)	Electromagnetic compatibility (EMC) - Part 4-22: Testing and measurement techniques - Radiated emissions and immunity testing in fully anechoic chambers (FAR)	JIS C 61000-4-22:2014 [IEC 61000-4-22:2010] (IDT)	Established: 14-02 Verified: 18-10
IEC 61000-4-23 [Ed.2.0: 16-10] (SC77C)	Electromagnetic compatibility (EMC) - Part 4-23: Testing and measurement techniques - HEMP and other testing methods for protective devices against emitted interference	TR C 61000-4-23:2006 [IEC 61000-4-23:2000] (IDT)	Abolished: 09-06

IDT (Identical), MOD (Modified)

Table 1 Standards of the IEC 61000-4 (testing and measurement techniques) series developed by TC77 (Part 3) (as of 2019-01)

International Standard (Latest Version) (Creator Organization)	Name of Standard	Domestic JIS Domestic TR (and Corresponding International Standard)	Year and Month of Establishment, Revision, Verification, or Abolishment
IEC 61000-4-24 [Ed.2.0: 15-11] (SC77C)	Electromagnetic compatibility (EMC) - Part 4-24: Testing and measurement techniques - Testing methods for protective devices against HEMP conducted interference	—	—
IEC 61000-4-25 [Ed.1.1: 12-05] (SC77C)	Electromagnetic compatibility (EMC) - Part 4-25: Testing and measurement techniques - HEMP immunity testing methods for equipment and systems	—	—
IEC 61000-4-27 [Ed.1.1: 09-04] (SC77A)	Electromagnetic compatibility (EMC) - Part 4-27: Testing and measurement techniques - Immunity testing methods for asymmetry	—	—
IEC 61000-4-28 [Ed.1.2: 09-04] (SC77A)	Electromagnetic compatibility (EMC) - Part 4-28: Testing and measurement techniques - Immunity testing methods for power frequency fluctuations	—	—
IEC 61000-4-29 [Ed.1.0: 00-08] (SC77A)	Electromagnetic compatibility (EMC) - Part 4-29: Testing and measurement techniques - Immunity testing methods for voltage dips, short-term power outages, and voltage fluctuations in DC power terminals	—	—
IEC 61000-4-30 [Ed.3.0: 15-02] (SC77A)	Electromagnetic compatibility (EMC) - Part 4-30: Testing and measurement techniques - Methods of measuring power quality	—	—
IEC 61000-4-31 [Ed.1.0: 16-07] (SC77B)	Electromagnetic compatibility (EMC) - Part 4-31: Testing and measurement techniques - Immunity testing methods for wide-band conducted EMI in AC power terminals	—	—
IEC TR 61000-4-32 [Ed.1.0: 02-10] (SC77C)	Electromagnetic compatibility (EMC) - Part 4-32: Testing and measurement techniques - Overview of HEMP Simulator	—	—
IEC 61000-4-33 [Ed.1.0: 05-09] (SC77C)	Electromagnetic compatibility (EMC) - Part 4-33: Testing and measurement techniques - Methods of measuring transient parameters in high-power electromagnetic fields	—	—
IEC 61000-4-34 [Ed.1.1: 09-11] (SC77A)	Electromagnetic compatibility (EMC) - Part 4-34: Testing and measurement techniques - Immunity testing for voltage dips, short-term power outages, and voltage fluctuations in electrical equipment exceeding 16 A of input current per day	JIS C 61000-4-34:2017 [IEC 61000-4-34:2005 +Am.1:2009] (IDT)	Established: 08-12 Revised: 17-03
IEC TR 61000-4-35 [Ed.1.0: 09-07] (SC77C)	Electromagnetic compatibility (EMC) - Part 4-35: Testing and measurement techniques - Overview of high-power electromagnetic field (HPEM) simulators	—	—
IEC 61000-4-36 [Ed.1.0: 14-11] (SC77C)	Electromagnetic compatibility (EMC) - Part 4-36: Testing and measurement techniques - Immunity testing methods for IEMI (deliberate EMI) of equipment and systems	—	—

Table 1 Standards of the IEC 61000-4 (testing and measurement techniques) series developed by TC77 (Part 4) (as of 2019-01)

International Standard (Latest Version) (Creator Organization)	Name of Standard	Domestic JIS Domestic TR (and Corresponding International Standard)	Year and Month of Establishment, Revision, Verification or Abolishment
IEC TR 61000-4-37 [Ed.1.0: 16-01] (SC77A)	Electromagnetic compatibility (EMC) - Part 4-37: Testing and measurement techniques - Calibration and inspection methods for harmonic emissions compliance testing systems	—	—
IEC TR 61000-4-38 [Ed.1.0: 15-08] (SC77A)	Electromagnetic compatibility (EMC) - Part 4-38: Testing and measurement techniques - Testing, inspection, and calibration procedures for voltage fluctuation and flicker compliance testing systems	—	—
IEC 61000-4-39 [Ed.1.0: 17-03] (SC77B)	Electromagnetic compatibility (EMC) - Part 4-39: Testing and measurement techniques - Radiated fields in close proximity - Immunity test	—	—

IDT (Identical), MOD (Modified)

In the standards of the IEC 61000-4 series developed by SC77B, the immunity testing for static electricity discharge (4-2), emitted radio wave frequency electromagnetic fields (4-3), electrical fast transient bursts (4-4), surges (4-5), and conducted interference induced by radio wave electromagnetic fields (4-6) cited in the common standards for immunity is of great importance, and all international standards are incorporated in JIS. There are also standards developed jointly by SC77B and CIS/A regarding TEM (transverse electromagnetic fields) waveguides (4-20), reverberation chambers (4-21), and fully anechoic chambers (also known as "fully anechoic rooms", abbreviated to "FAR") (4-22) for emissions measurement and immunity testing, of which 4-20 and 4-22 are incorporated in JIS. Other immunity testing standards include those for pulse magnetic fields (4-9), damped oscillatory wave magnetic fields (4-10), ring waves (4-12), and damped oscillatory waves (4-18). Recently developed standards for immunity testing include immunity testing for wide-band conducted EMI in AC power terminals (4-31) and immunity testing for proximity electromagnetic fields (4-39).

Among the standards of the IEC 61000-4 series developed by SC77C, the standard for testing methods for HEMP (high-altitude electromagnetic pulses) and other protective devices against emitted interference (4-23) was incorporated in JIS, but this standard was abolished in 2009. While not incorporated in JIS, there is also a standard for testing methods for protective devices against HEMP conducted interference (4-24). For immunity testing methods, there are standards on HEMP immunity testing methods for equipment and systems (4-25) and IEMI (Intentional Electro-Magnetic Interference) immunity testing methods for equipment and systems (4-36). In addition, standards relating to simulators include those for HEMP (4-32) and HPEM (high-power electromagnetic fields) (4-35). Other standards include those on methods for measuring transient parameters for high-power electromagnetic fields (4-33).

[References]

1）EMC Electromagnetic Environmental Studies Handbook (head of the editing committee: Risaburo Sato) References EMC common standards and stipulations (editing chief examiner: Masamitsu Tokuda), Mimatsu (publisher), Maruzen (publisher), pp.88-110, 2009.9.

2）Edited by the IEEJ Dedicated Committee for Investigating Noise Immunity in Electronic and Electrical Equipment (Chair: Masamitsu Tokuda): Handbook for Testing and Engineering Noise Immunity in Electronic and Electrical Equipment, Kagaku Gijutsu Shuppan (publisher), Maruzen (publisher), pp.31-32, pp.54-55, 2013.4.

3）Masamitsu Tokuda: I. International organizations for EMC standardization and EMC standards, special feature "World EMC standards and stipulations" (FY 2019 edition), Japan Management Association, p.2-14, 2019.4.

4）IEC, EMC Zone, Basic EMC Publications, IEC 61000 Structure
http://www.iec.ch/emc/basic_emc/basic_61000.htm

5）IEC Guide 107: Electromagnetic compatibility - Guide to the drafting of electromagnetic compatibility publications
https://webstore.iec.ch/publication/7518

6）JIS handbook JIS HB 70 (EMC) Japan Standards Association, 2007.07.
jishb200707-70

Masamitsu Tokuda

1967 Graduated from Electronics Engineering Department of Hokkaido University
1969 Joined NTT, assigned to the Electrical Communications Laboratories
1987 Leader of EMC Study Group, NTT Telecommunication Networks Laboratories
1996 Professor of Electric Engineering Department, Kyushu Institute of Technology
2001 Professor of Electronic Communication Department, Musashi Engineering University
2010 Professor emeritus of Tokyo City University
Visiting co-researcher of the Graduate School of Frontier Sciences, The University of Tokyo

Major prizes received
1986 Merit award – IEICE
(on the design theory and evaluation method for optical fiber cables)
1997 Information communication merit award by MPT
(on EMC technology development)
2003 Industrial standard merit award by the minister of METI
2004 IEICE fellow
2007 Promoted to IEEE fellow

Report on the VCCI seminar

Industrial Technology Institute, Miyagi Prefecture

Sponsor: Industrial Technology Institute, Miyagi Prefecture

1. Date and time: Wednesday, January 31, 2019 13:30 - 16:40
2. Venue: Industrial Technology Institute, Miyagi Prefecture (Sendai) 1F Meeting hall
3. Participants: 15

4. Speeches (Chair: Masahiro Hoshino, Secretary General of VCCI Council)

(1) Introduction to VCCI Council activities and future trends in EMC standards
Akira Oda, Executive Director (VCCI Council)

(2) On international standards for multimedia equipment (CISPR 32)
Minoru Hirahara, Chairman of Technical Subcommittee (Fujitsu Limited)

(3) Overview of the VCCI training business and notes on measurement methods
Shinichi Okuyama, Chairman of Education Subcommittee (NEC Platforms, Ltd.)

(4) Overview and notes on registering VCCI facilities
Seijun Fukaya, Secretariat of the Measurement Facility Registration Committee (VCCI Council)

* Questions and answers Hidenori Muramatsu, Technical Manager (VCCI Council)

5. Overview

This session was held about four years after the previous session in November 2014. Participants included those from companies in Miyagi Prefecture and Yamagata Prefecture, as well as associates of our sponsor, the Industrial Technology Institute, who were enthusiastic to attend.

Since 2006, VCCI Council has been holding briefing sessions on VCCI Council's activities and technical seminars on EMC at various prefectures' industrial institutions. VCCI Council plans to continue holding such events at various prefectures and regions while incorporating requests from its attendees.

We are deeply grateful to Mr. Murata, Mr. Nomura, Mr. Sakashita, Mr. Takata, Mr. Sato, and all other associates of the Industrial Technology Institute in Miyagi Prefecture for giving us the opportunity to hold this session.

Report on the VCCI seminar

Kyoto Institute of Technology

Sponsor: Kyoto City, Kyoto Institute of Technology

1. Date and time: Thursday, February 7, 2019 13:30 - 15:30
2. Venue: Room N205, Bldg. 15 2F, Kyoto Institute of Technology
3. Participants: 16 (plus several participants from the Kyoto Institute of Technology)

4. Speeches (Chair: Masahiro Hoshino, Secretary General of VCCI Council)

(1) Introduction to VCCI Council's history and system, trends in EMC standards in Japan and other countries

Akira Oda, Executive Director (VCCI Council)

(2) Overview of compliance checks, notices, and market sampling tests

Minoru Hirata, Principal Engineer (VCCI Council)

(3) Introduction to the VCCI education and training business

Toshiki Shimasaki, Vice Technical Manager (VCCI Council)

* Questions and answers

5. Overview

Last year, a new anechoic chamber was established at the Kyoto Institute of Technology. In December, this chamber was registered as a VCCI Council measurement facility. The Kyoto Institute of Technology holds a seminar on basic EMC techniques, and invited VCCI Council to speak at the second holding of this seminar. While the seminar was intended for managers of local mid- to small-scale companies, it was also enthusiastically attended by associates of various electronics companies in Kansai. Following the speeches from VCCI Council was a talk introducing Kyoto City's IoT measures and a tour of the anechoic chamber, ending at 17:00.

Since 2006, VCCI Council has been holding briefing sessions on VCCI Council's activities and technical seminars on EMC at various prefectures' industrial institutions. VCCI Council plans to continue holding such events at various prefectures and regions while incorporating requests from its attendees.

We are deeply grateful to Kyoto Institute of Technology Vice President Masahiro Yoshimoto, Appointed Specialist Izumi, who assisted us in so many ways during the preparation period, Program Manager Mukai, and all other associates of the Kyoto Institute of Technology for giving us the opportunity to hold this session.

Status on FY2019 Market Sampling Tests

Market Sampling Test Subcommittee

As of March 29, 2019

Planned number of market sampling tests	Loan-based	45	100
	Purchase-based	55	

Sampling test	Selected	Cancelled (Not shipped, etc.)	Owner's consent pending Inspectable samples	Testable samples	Test completed	Judgment awaited	Judgment			
							Passed	Failed - tentative		
								Finally passed	Finally failed	Pending
Grand total	106	6	0	100	100	0	98	2	0	0
(Previous month grand total)	106	6	0	100	98	21	75	0	0	2
Loan-based testing total	51	6	0	45	45	0	44	1	0	0
1st Quarter	12	1	0	11	11	0	10	1	0	0
2nd Quarter	12	2	0	10	10	0	10	0	0	0
3rd Quarter	12	2	0	10	10	0	10	0	0	0
4th Quarter	15	1	0	14	14	0	14	0	0	0
Purchase-based testing total	55	0	0	55	55	0	54	1	0	0
1st Quarter	18	0	0	18	18	0	17	1	0	0
2nd Quarter	6	0	0	6	6	0	6	0	0	0
3rd Quarter	13	0	0	13	13	0	13	0	0	0
4th Quarter	18	0	0	18	18	0	18	0	0	0

Final Result

Passed	Failed	Pending
100	0	0

Document inspection	Selected	Cancelled (withdrawal, etc.)	Owner's consent pending Inspectable samples	Inspectable samples	Pre-check completed	Judgment awaited	Judgment completed	Judgment	
								Cleared	Problems identified
	42	1	0	41	41	0	41	39	2

* A case among the document inspections is a change from a loan-based test.

Report from the Secretariat

● List of Members (November 2019 - April 2019)

New members

Membership	Member No.	Company Name	Country
Regular	3976	WA HOLDINGS Co., Ltd.	JAPAN
Regular	3977	PiNON Corp.	JAPAN
Regular	3983	Matsumura Engineering Co., Ltd.	JAPAN
Regular	3948	Facebook Technologies, LLC	USA
Regular	3957	Carl Zeiss AG	GERMANY
Regular	3962	Tatung Technology Inc.	CHINESE TAIPEI
Regular	3963	CarVi., Inc.	KOREA
Regular	3964	EM-TECH	KOREA
Regular	3965	Luxshare Precision Industry Co., Ltd.	CHINA
Regular	3966	Corsair Memory Inc.	CHINESE TAIPEI
Regular	3967	BlackRidge Technology	USA
Regular	3968	ORION DISPLAY Co., Ltd.	KOREA
Regular	3969	VERSA NETWORKS	USA
Regular	3972	AMCS LLC	USA
Regular	3974	PAX Computer Technology (Shenzhen) Co., Ltd.	CHINA
Regular	3975	Umbo CV Inc.	CHINESE TAIPEI
Regular	3978	CTL	USA
Regular	3979	Skytech Creations Limited	HONG KONG
Regular	3984	UCOMM TECHNOLOGY CO., LTD.	KOREA
Regular	3985	CalDigit Inc.	USA

Company name change

Membership	Member No.	Company Name	Country	Old company name
Regular	76	ALPS ALPINE CO., LTD.	JAPAN	ALPS ELECTRIC CO., LTD.
Regular	1399	TOKYO ELECTRON DEVICE NAGASAKI LIMITED	JAPAN	/AVAL NAGASAKI CORP.
Regular	1651	Keysight Technologies Japan K.K.	JAPAN	Keysight Technologies Japan G.K.
Regular	1780	Panasonic Life Solutions Networks Co., Ltd.	JAPAN	Panasonic Eco Solutions Networks Co., Ltd.
Regular	3426	V-net AAEON Corporation Limited	JAPAN	V-net Corporation Limited
Regular	585	Vertiv IT Systems, Inc.	USA	Avocent Corporation
Regular	3608	Eve Systems GmbH	GERMANY	Elgato Systems GmbH
Supporting	2024	Panasonic Co., Ltd.	JAPAN	Panasonic Smart Factory Solutions Co., Ltd.
Supporting	720	Nemko USA Inc.	USA	Nemko USA, Inc. - San Diego EMC Division

Note: Please fill out and submit "Form 9 Change Notification" on the website when a company name has been changed.

Withdrawal members

Membership	Member No.	Company Name	Country
Regular	103	Y-E DATA INC.	JAPAN
Regular	302	PHOTRON LIMITED	JAPAN
Regular	940	SECURE-TECH CORPORATION	JAPAN
Regular	950	BANDAI CO., LTD.	JAPAN
Regular	976	MegaChips Corporation	JAPAN
Regular	2125	Artiza Networks, Inc.	JAPAN
Regular	3185	Yokogawa Test & Measurement Corporation	JAPAN
Regular	3228	Cathay Tri-Tech., Inc.	JAPAN
Regular	3293	WHITE BUSINESS INITIATIVE Co.	JAPAN
Regular	3400	Takara telesystems Co., Ltd.	JAPAN
Regular	3557	mitsuboshi diamond industrial co., ltd.	JAPAN
Regular	3583	TOKIN Corporation	JAPAN
Regular	3715	Miura Corporation	JAPAN
Regular	3747	IWAYA CORPORATION	JAPAN
Regular	3774	SAC CO., Ltd.	JAPAN
Regular	3864	Southco Japan Limited	JAPAN
Regular	3866	Mobile Techno Corp.	JAPAN
Regular	3887	BEWITH Enterprise Japan, Ltd.	JAPAN
Regular	3927	KASHIMA ELECTRONICS INC.	JAPAN
Regular	286	Hewlett Packard Enterprise Company	USA
Regular	748	Microsemi Storage Solutions Inc.	USA
Regular	927	Samji Electronics Co., Ltd.	KOREA
Regular	2501	SMART Technologies ULC	CANADA
Regular	2694	Micron Consumer Products Group, Inc.	USA
Regular	2754	Dialogic (US) Inc.	USA
Regular	2956	RadiSys Corporation	USA
Regular	3023	NetScout Systems Texas, LLC	USA
Regular	3036	Moda Inc.	KOREA
Regular	3041	Kontron America	USA
Regular	3184	BYD Precision Manufacture Co., Ltd.	CHINA
Regular	3214	Lite-On Technology Corporation	CHINESE TAIPEI
Regular	3317	KOSTEC Co., Ltd.	KOREA
Regular	3422	Digital View Limited	HONG KONG
Regular	3448	Nimble Storage	USA
Regular	3599	HappyOrNot Ltd.	FINLAND
Regular	3654	C+A Global	USA
Regular	3665	zSpace, Inc.	USA
Regular	3666	Weifang GoerTek Electronics Co., Ltd.	CHINA
Regular	3668	Veritas Technologies Corp.	USA
Regular	3698	Virtium LLC	USA
Regular	3737	Jogtek Corp.	CHINESE TAIPEI
Regular	3749	ASRockRack Incorporation	CHINESE TAIPEI
Regular	3766	Primera Technology, Inc.	USA
Regular	3794	Inspur Electronic Information Industry Co., Ltd.	CHINA
Regular	3820	CIMCON Lighting, Inc.	USA

Regular	3822	Advoli Limited	HONG KONG
Regular	3830	Mionix AB	SWEDEN
Regular	3841	Meta Company	USA
Regular	3846	Winner Wave Limited	CHINESE TAIPEI
Regular	3857	Ponte Technologies Co., Ltd.	CHINA
Regular	3860	SPOTLIGHT CARRY CORP. LIMITED.	HONG KONG
Supporting	92	YOKOGAWA ELECTRIC CORPORATION	JAPAN
Supporting	3318	YAMAHA MOTOR CO., LTD.	JAPAN
Supporting	639	TUV Rheinland Nederland BV	THE NETHERLANDS
Supporting	715	DNB Engineering, Inc.	USA
Supporting	1818	BWS TECH, INC.	KOREA
Supporting	2670	Precision Machinery Research & Development Center	CHINESE TAIPEI
Supporting	3498	Guangdong Keyway Testing Technology Co., Ltd.	CHINA
Supporting	3517	Centre of Testing Service Co., Ltd.	CHINA
Supporting	3587	The First Research Institute of Telecom. Tech. TFTX Laboratory	CHINA

VCCI Schedule for FY 2019

April ・Exhibition at TECHNO FRONTIER ・The basic technique of EMI measurement	**May** ・The basic of electromagnetic waves, EMI measurement technique below 1 GHz	**June** ・EMC SAPPORO & APEMC 2019 ・The EMI measurement technique above 1 GHz ・Release VCCI Dayori No.133
July ・VCCI Business Reporting Meeting ・The level up of EMI measurement technique ・The EMI Measurement Instrumentation uncertainty ・Release Annual Report	**August**	**September** ・Release VCCI Dayori No.134
October ・Exhibition at CEATEC JAPAN ・VCCI International Forum ・The basic technique of EMI measurement	**November** ・The basic of electromagnetic waves, EMI measurement technique below 1 GHz	**December** ・The EMI measurement technique above 1 GHz ・Release VCCI Dayori No.135
January ・VCCI Technical Symposium ・The level up of EMI measurement technique ・The EMI Measurement Instrumentation uncertainty	**February**	**March** ・Release VCCI Dayori No.136

● Status of Compliance Test Notifications (V-2+VCCI 32-1)
(January 2019 ～ March 2019)

					January 2019			February 2019			March 2019		
			Class A	Class B	Class A	Class B	Total	Class A	Class B	Total	Class A	Class B	Total
Computer	Server	Super Computer, Server, etc.	A 2	a 2	12	2	14	33	1	34	33	0	33
	Tabletop type	WS, Desk-top PCs, etc.	B 2	b 2	1	18	19	2	14	16	3	10	13
	Portable type	Note PCs, Tablet PCs, etc.	C 2	c 2	0	52	52	0	24	24	0	27	27
	Others	Office Computer, Wearable computers, etc.	E 2	e 2	1	3	4	5	2	7	2	2	4
Peripherals/Terminals Equipment	Storage Device	HDD, SSD, USB Memory, Media drives, etc. Disk drives, NAS, DAS, SAN, etc.	G 2	g 2	5	37	42	5	24	29	3	32	35
	Printer	Printer (Compound equipment included), etc.	H 2	h 2	5	8	13	5	5	10	8	8	16
	Display	CRT displays, Monitor, projector, etc.	J 2	j 2	8	34	42	14	19	33	10	28	38
	Input/Output Device （excluding Auxiliary Memory, Printer, Display）	Image scanners, OCR, etc.	M 2	m 2	2	5	7	2	0	2	1	7	8
	General Purpose Terminal	Display control terminals, etc.	N 2	n 2	0	2	2	0	6	6	1	1	2
	Exclusive Terminal	POS, Terminal for Financial and Insurance use, etc.	Q 2	q 2	8	1	9	11	1	12	5	1	6
	Other Peripherals Equipment	Others (PCI cards, Graphics cards, Mouse, Keyboard, etc.)	R 2	r 2	8	48	56	7	16	23	9	31	40
Audio visual equipment	Broadcast receivers	Television, Radio, Tuner, Video recorder, Set-top Boxes, etc.	K 2	k 2	0	1	1	0	0	0	0	1	1
	Audio equipment	Speaker, Amplifier, IC recorder, MP3 player, Headsets, etc.	L 2	l 2	2	8	10	0	5	5	1	0	1
	Video/Camera equipment	Digital video cameras, Web cameras, Network cameras, Video players, Photo frames, Digital-camera, etc.	I 2	i 2	10	7	17	1	6	7	1	11	12
	Others	Other Audio visual equipment	P 2	p 2	3	1	4	0	3	3	1	1	2
Copying Machine/ Compound	-	Copying Machine/Compound equipment, etc.	S 2	s 2	1	0	1	1	4	5	1	0	1
Communications Equipment	Terminal equipment	Mobilephone, Smartphone, PHS telephones	T 2	t 2	0	1	1	0	8	8	0	1	1
		Telephone Equipment (PBX, FAX, Key Telephone System, etc.), Cordless telephones	U 2	u 2	0	0	0	3	3	6	1	0	1
	Network related equipment	Network Channel Terminating Equipment (Modem, Digital Transmission Equipment, DSU, TA, etc.)	V 2	v 2	2	0	2	4	2	6	4	2	6
		LAN Equipment (Rooter, HUB, etc.), Switching-node, etc.	W 2	w 2	49	18	67	32	16	48	48	18	66
	Others	Other Communications Equipment	X 2	x 2	18	3	21	14	8	22	31	5	36
Entertainment and educational equipment	Electronic stationeries	Electronic dictionaries, Electronic book readers, etc.	D 2	d 2	0	1	1	0	0	0	0	1	1
	Electronic toys	Game machines, Game pads, Toy drones, etc.	Y 2	y 2	0	0	0	0	0	0	0	1	1
	Lighting control equipment for entertainment	Lighting control equipment for entertainment	Z 2	z 2	0	0	0	0	0	0	1	0	1
	Others	Others (Navigator, etc.)	F 2	f 2	0	0	0	0	0	0	0	0	0
Others			O 2	o 2	5	7	12	7	6	13	18	6	24
Total					140	257	397	146	173	319	182	194	376

● Status of Compliance Test Notifications (VCCI 32-1)
(January 2019 ～ March 2019)

					January 2019			February 2019			March 2019		
			Class A	Class B	Class A	Class B	Total	Class A	Class B	Total	Class A	Class B	Total
Computer	Server	Super Computer, Server, etc.	A 2	a 2	12	2	14	31	1	32	30	0	30
	Tabletop type	WS, Desk-top PCs, etc.	B 2	b 2	1	18	19	2	14	16	3	7	10
	Portable type	Note PCs, Tablet PCs, etc.	C 2	c 2	0	50	50	0	24	24	0	21	21
	Others	Office Computer, Wearable computers, etc.	E 2	e 2	1	3	4	5	2	7	2	2	4
Peripherals/Terminals Equipment	Storage Device	HDD, SSD, USB Memory, Media drives, etc. Disk drives, NAS, DAS, SAN, etc.	G 2	g 2	5	17	22	5	17	22	3	29	32
	Printer	Printer (Compound equipment included), etc.	H 2	h 2	5	7	12	5	5	10	6	7	13
	Display	CRT displays, Monitor, projector, etc.	J 2	j 2	3	28	31	10	19	29	2	27	29
	Input/Output Device （excluding Auxiliary Memory, Printer, Display）	Image scanners, OCR, etc.	M 2	m 2	2	5	7	2	0	2	1	7	8
	General Purpose Terminal	Display control terminals, etc.	N 2	n 2	0	0	0	0	5	5	1	1	2
	Exclusive Terminal	POS, Terminal for Financial and Insurance use, etc.	Q 2	q 2	8	1	9	6	0	6	3	1	4
	Other Peripherals Equipment	Others (PCI cards, Graphics cards, Mouse, Keyboard, etc.)	R 2	r 2	8	39	47	7	11	18	7	28	35
Audio visual equipment	Broadcast receivers	Television, Radio, Tuner, Video recorder, Set-top Boxes, etc.	K 2	k 2	0	0	0	0	0	0	0	0	0
	Audio equipment	Speaker, Amplifier, IC recorder, MP3 player, Headsets, etc.	L 2	l 2	1	7	8	0	2	2	1	0	1
	Video/Camera equipment	Digital video cameras, Web cameras, Network cameras, Video players, Photo frames, Digital-camera, etc.	I 2	i 2	7	7	14	1	6	7	1	11	12
	Others	Other Audio visual equipment	P 2	p 2	3	1	4	0	3	3	1	1	2
Copying Machine/ Compound	-	Copying Machine/Compound equipment, etc.	S 2	s 2	1	0	1	0	3	3	1	0	1
Communications Equipment	Terminal equipment	Mobilephone, Smartphone, PHS telephones	T 2	t 2	0	1	1	0	8	8	0	1	1
		Telephone Equipment (PBX, FAX, Key Telephone System, etc.), Cordless telephones	U 2	u 2	0	0	0	1	3	4	1	0	1
	Network related equipment	Network Channel Terminating Equipment (Modem, Digital Transmission Equipment, DSU, TA, etc.)	V 2	v 2	2	0	2	0	2	2	2	1	3
		LAN Equipment (Rooter, HUB, etc.), Switching-node, etc.	W 2	w 2	33	14	47	24	15	39	39	14	53
	Others	Other Communications Equipment	X 2	x 2	16	3	19	13	8	21	30	3	33
Entertainment and educational equipment	Electronic stationeries	Electronic dictionaries, Electronic book readers, etc.	D 2	d 2	0	0	0	0	0	0	0	1	1
	Electronic toys	Game machines, Game pads, Toy drones, etc.	Y 2	y 2	0	0	0	0	0	0	0	0	0
	Lighting control equipment for entertainment	Lighting control equipment for entertainment	Z 2	z 2	0	0	0	0	0	0	0	0	0
	Others	Others (Navigator, etc.)	F 2	f 2	0	0	0	0	0	0	0	0	0
Others			O 2	o 2	3	7	10	1	6	7	17	5	22
Total					111	210	321	113	154	267	151	167	318

● Registration Status of Measurement and Other Facilities

The following table indicates the status on registration of measuring facilities in the most recent three months.

Facilities listed here are only those made open by registering members in principle. Members with those facilities whose valid period expired are kindly advised to contact VCCI to inform of the status they are in. Status to choose from are, renewal application being filed, new application being filed, waiting for the next issue to carry, or terminating the registration (all facilities are posted in the Web site).

Facilities in Japan are listed in Japanese.

List of newly registered or renewed facilities (February 2019 – April 2019)

R: Field strength measuring facility C: Mains Port Conducted interference measuring facility T: Communication Port

Conducted interference measuring facility G: Radiated EMI measurement facilities above 1GHz

Company name	Equipment name	3 m	10 m	30 m	Dark 3m	Dark 10m	Registration number	Effective date	Location	Contact to:
Shenzhen Morlab Communications Technology Co., Ltd.	EMC LAB-2	-	-	-	-	-	T-20043	2022/2/17	Fl.1,Building A, Feiyang Science park, No.8 Longchang Road, Block 67, Baoan District, Shenzhen, Guangdong Province, China	+8675536698555
Intertek ETL SEMKO Korea Ltd.	Intertek ETL SEMKO Korea Ltd.	-	-	-	-	-	T-20044	2022/2/17	Intertek building, 3, Gongdan-ro 160beon-gil, Gunpo-si, Gyeonggi-do, Korea	82 31 8069 3750
Sporton International Inc.	CO01-KS	-	-	-	-	-	C-20049	2022/2/17	473-21 Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea	+86 21 6176 5666 ext 111
Audix Technology Corporation	Audix Technology Corporation No.2 10 m Semi Anechoic Chamber	-	-	-	-	-	G-20064	2022/2/17	No.53-11, Dingfu, Linkou Dist., New Taipei City, Taiwan	+886 2 2609-2133
Shenzhen Academy of Metrology and Quality Inspection	SMQCE216	-	-	-	-	-	C-20048	2022/2/17	4 Tongfa Rd. Xili, Nanshan, Shenzhen, Guangdong, China	+8675586009898
Shenzhen Microtest Co., Ltd.	Conducted Emissions Lab	-	-	-	-	-	C-20047	2022/2/17	1F,East Block,Laobing Building,Xingye Road, Bao'an District,Shenzhen, China	+86 0755 88850135-8082
日本 NCR 株式会社	NCR WHQ EMC Radiated below 1GHz	-	-	-	-	○	R-20063	2022/2/17	864 Spring Street NW, Atlanta, GA 30308, USA	+17704952825
Beijing Boomwave Test Service Co., Ltd.	10 Meters Semi-Anechoic Chamber	-	-	-	-	○	R-20062	2022/2/17	EMC Building, No.1 Wang Jing East Road, Chao Yang District, Beijing, P.R.China	+86-10-64711866
Audix Technology Corporation	Audix Technology Corporation No.2 10 m Semi Anechoic Chamber	-	-	-	○	○	R-20065	2022/2/17	No.53-11, Dingfu, Linkou Dist., New Taipei City, Taiwan	+886 2 2609-2133
Global EMC Standard Tech. Corp.	A6	-	-	-	○	-	R-20050	2022/3/17	No.3, Baodoucuokeng, Linkou Dist., New Taipei City 244, Taiwan, R.O.C.	+886226035321 #391

Company name	Equipment name	3 m	10 m	30 m	Dark 3m	Dark 10m	Registration number	Effective date	Location	Contact to:
Company name	Equipment name	3 m	10 m	30 m	Dark 3m	Dark 10 m	Registration number	Effective date	Location	Contact to:
NTREE Co., Ltd.	10 m Chamber	-	-	-	-	○	R-20059	2022/3/17	228-60, Saneop-ro, 155beon-gil, Gwonson-ru, suwon-si, Gyeonggi-do, Korea	+82-31-893-0999
TUV Rheinland (Guangdong) Ltd.	Radiated emission Chamber_District B	-	-	-	○	-	R-20061	2022/3/17	No.102, 1F of Southwest and No.205, 2F of West Warehouse Building, No.767 Tianyuan Road, Tianhe District, Guangzhou, Guangdong, P.R.China	+862028391159
Shenzhen Academy of Metrology and Quality Inspection	SMQCE216	-	-	-	-	-	T-20047	2022/3/17	NETC Building, No.4 Tongfa Rd., Xili, Nanshan, Shenzhen, China	+8675586009898
DSTech Co.	10m semi-anechoic chamber	-	-	-	○	○	R-20066	2022/3/17	25, 2565beon-gil, Jungbu-daero, Yangji-myun, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea	82-031-336-1798
Bay Area Compliance Laboratories Corp. (Kunshan)	3m Semi-anechoic chamber	-	-	-	-	-	G-20067	2022/3/17	No.248 Chenghu Road, Kunshan,Jiangsu province, China	0512-86175000
Bay Area Compliance Laboratories Corp. (Kunshan)	3m Semi-anechoic chamber	-	-	-	○	-	R-20067	2022/3/17	No.248 Chenghu Road, Kunshan,Jiangsu province, China	0512-86175000
Bay Area Compliance Laboratories Corp. (Kunshan)	Shielded room	-	-	-	-	-	T-20050	2022/3/17	No.248 Chenghu Road, Kunshan,Jiangsu province, China	0512-86175000
Bay Area Compliance Laboratories Corp. (Kunshan)	Shielded room	-	-	-	-	-	C-20051	2022/3/17	No.248 Chenghu Road, Kunshan,Jiangsu province, China	0512-86175000
Sporton International Inc.	Hwa Ya 3m Semi-anechoic Chamber 03CH04-HY	-	-	-	-	-	G-20066	2022/3/17	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City	+886-3-327-3456
DSTech Co.	10m semi-anechoic chamber	-	-	-	-	-	G-20069	2022/3/17	25, 2565beon-gil, Jungbu-daero, Yangji-myun, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea	82-031-336-1798
I.T.L. (PRODUCT TESTING) LTD	EMC Laboratory, Telrad Industrial Park	-	-	-	-	-	G-20068	2022/4/21	1 Batsheva St., Lod, Israel	+97289186100
Sporton International Inc.	KunShan 3m Semi-anechoic Chamber 03CH06-KS	-	-	-	○	-	R-20060	2022/4/21	No. 1098, Pengxi North Road, Kunshan Economic Development Zone, Jiangsu province, China	+886-0512-57900158
Standard Bank Co., Ltd.	Standard Bank Co., Ltd.	-	-	-	-	○	R-20071	2022/4/21	48, Gunpocheomdansaneop 2-ro, Gunpo-si, Gyeonggi-do, Republic of Korea	+82-31-393-9394
EMC Technologies Pty Ltd.	EMC Technologies PTY LTD	-	-	-	-	-	C-20053	2022/4/21	176 Harrick Road, Keilor Park, Victoria, Australia	+613 9365 1000

Company name	Equipment name	3 m	10 m	30 m	Dark 3m	Dark 10m	Registration number	Effective date	Location	Contact to:
3C Test Ltd	Anechoic Chamber 3	-	-	-	○	-	R-20069	2022/4/21	Silverstone Technology Park, Silverstone Circuit, Silverstone, Northamptonshire, United Kingdom	+44 1327 857500

Closing words

Microwave ovens and handheld game consoles

Of my five children, my second- and fourth-born elementary-school-age sons are addicted to handheld online games. Their handheld game consoles are connected to the internet through our household mobile wifi router. We discovered a problem, though: whenever the microwave was used in the next room, the consoles would lose their internet connection. When my sons were playing their games, I'd often hear them angrily exclaiming, "Hey! I got disconnected. Mom, you used the microwave, didn't you!?" and my wife saying, "Oh, right. I forgot!"

Sensing a chance to impress them as their dad, I rattled off some expert-sounding lines. "It's because of interference. The microwave and wifi both use a 2.4 GHz frequency band." I tried changing the frequency of the wifi router, but it only supported 2.4 GHz. I tried bringing the handheld game console and wifi router close together, and distancing the wifi router from the microwave, but to no avail. So much for being an impressive dad. "No using the microwave while the kids are playing games" became a household rule.

As a would-be engineer, I would have liked to get to the bottom of the microwave problem, but it turned out that wasn't necessary. Caving to my eldest daughter's demands to let her watch a Masaki Suda drama series that was only available on Hulu, I upgraded our internet connection from slow mobile wifi to optical fiber, and problem solved! Our optical fiber router supported 5-GHz wifi connections, thus providing the household with a comfortable electromagnetic environment.

Speaking of electromagnetic waves in the household, when I point the TV remote at my wife and press a button, she squirms and tries to get away, saying, "Stop it! You're shooting electromagnetic waves at me!" Sure, you could call the infrared radiation from the remote "electromagnetic waves", but if these were harmful to humans, people sitting at a *kotatsu* (a Japanese low table with a heater on the underside covered by a blanket) would be expected to take lethal damage. Try as I might to explain to her that it was harmless, my words fell on deaf ears, as she was hell-bent on escaping the electromagnetic onslaught from her smiling maniac of a husband. Although my wife's case is extreme, if this is more or less how people in general view electromagnetic waves, I figure the PR people trying to spread global awareness of VCCI Council's activities must have a tough job. Of course, that won't stop me from pointing the remote at my wife. （T.Y.）

VCCI Dayori

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