



**EXPLANATORY MEMO ISSUED BY THE
INFO-COMMUNICATIONS DEVELOPMENT AUTHORITY OF SINGAPORE**

**REVISION OF THE IDA ELECTROMAGNETIC COMPATIBILITY AND
SAFETY FRAMEWORK FOR
INFORMATION AND COMMUNICATIONS TECHNOLOGY EQUIPMENT**

19 September 2016

INTRODUCTION

1 On 23 June 2016, IDA issued a public consultation paper on the proposed revision of the IDA electromagnetic compatibility (“EMC”) and safety framework for information and communications technology (“ICT”) equipment. The proposed revision takes into account the ongoing standards development in the international and regional standardisation bodies for ensuring EMC and safety of ICT equipment.

2 By the close of the public consultation on 22 July 2016, IDA received comments from the following two Respondents:

(a) Sony EMCS (Malaysia) Sdn Bhd; and

(b) Wideminds Pte Ltd.

3 IDA thanks the Respondents for their feedback. IDA has reviewed the comments, and this document discusses the issues in question and sets out IDA’s decision.

BACKGROUND

4 IDA deems it necessary to streamline the EMC and safety requirements for the convergence of audio-visual (“AV”) technologies and ICTs deployed in equipment; and to re-capture requirements defined by the International Electrotechnical Commission (“IEC”) for a family of products termed multimedia equipment (“MME”). Adoption of the IEC EMC standards for MME (CISPR¹ 32 and Final Draft CISPR 35) may facilitate apt assessments of requirements for limiting electromagnetic interference, and ensuring a level of performance not impeded by any interference for equipment deploying multiple technologies. The CISPR 32 standard further identifies emission requirements for the different types of input/output connections for communications, control and power sources that may come with the MME. Adoption of the hazard-based IEC safety standard for AV and ICT equipment (IEC 62368-1) on the other hand, may provide apt assessments of equipment designed for multiple technologies and made to be hazard-free², operating in various modes and environments.

5 IDA notes the International Telecommunication Union’s (“ITU”) harmonisation of requirements for protecting home network devices³ (that deploy wired-line or wireless technology) from the growing influence of the electromagnetic field (“EMF”) phenomenon⁴. The ITU recommendations for protection against interference refer to the IEC/CISPR family of EMC and safety standards for ICT equipment. Likewise, the European implementation of these IEC/CISPR standards constitutes the essential

¹ CISPR is the International Special Committee on Radio Interference of the IEC.

² Application of the hazard-based safety standard would reduce the risk of injury or damage due to hazards like electric shock, excessive temperature, mechanical instability, etc.

³ A home network device is a type of electronic or electrical equipment with a primary function of distributing data within the home, between the network termination point and one or more terminal devices (ITU-T K.74). Examples of home network devices include optical network units, routers or broadband modems, set-top-boxes and personal computers with telecommunication ports. Examples of terminal devices are television sets and multimedia equipment.

⁴ EMF phenomenon exists in the environment due to the ability of ICT, electrical and electronic equipment to create electromagnetic disturbances that may interfere with the functions of other ICT equipment and services.

requirements of the EMC Directive (2014/30/EU) for adequate level of EMC to avoid interference; and Low Voltage Directive (“LVD”, 2014/35/EU) for safety of use. These two Directives are essential parts of the Radio Equipment Directive⁵ (“RED”, 2014/53/EU) enforced in the European Union (“EU”) for market entry of radio equipment. Moreover, the RED Directive has repealed the Radio & Telecommunication Terminal Equipment (“R&TTE”) Directive 1999/5/EC, making requirements for market entry of fixed-line terminal equipment in the EU largely covered by these two Directives.

SUMMARY OF RESPONSES & IDA’S DECISION

Scope of the IDA EMC and Safety Framework for ICT Equipment

6 Respondents agreed with IDA that Singapore should wait for international approval of the Final Draft CISPR 35 EMS (immunity) standard before considering its adoption to complement the CISPR 32 EMI (emission) standard to achieve a fully streamlined EMC testing methodology for MME.

7 Respondents also agreed that the EMC (EMI and EMS) standards adopted by IDA should exclude other types of electrical or electronic products. There is no compelling need to administer pre-market EMC for such products to the relevant CISPR standards (e.g. the CISPR 14 EMC standards for household appliances), and post-market mitigation by means of the Radio-communication Regulations⁶ should suffice.

8 As an alternative to the CISPR 22/32 standard for emission limits, Respondents have pointed out that IDA may recognise the Federal Communications Commission (“FCC”) Part 15 Regulations, Subpart B for unintentional radiators (§ 15.109). However, unlike FCC, IDA does not include computers and peripherals in its EMC regulation.

9 IDA may qualify its EMC and safety framework for ICT equipment only to apply to equipment that involves the use of any telecommunication (or radio-communication) system. For instance, conformity assessment of AV equipment and/or its power adapter to the relevant EMC and safety requirements may not fall within IDA’s purview, if it does not involve any communications technology.

Electromagnetic Interference (“EMI”) or Emission Requirements

10 Respondents recognised the importance of controlling unwanted emissions from ICT equipment to avoid interference and allow coexistence of increasingly more types of equipment used in close proximity. Respondents submitted that enforcement of common EMI requirements would facilitate wider market entry of ICT equipment. IDA notes the benefit in accepting regional/national EMI standards that have

⁵ The Radio Equipment Directive 2014/53/EU refers to the harmonisation of laws in the European Union relating to making available radio equipment (commonly known as the RED) on the market. The RED Directive ensures efficient use of radio spectrum to avoid harmful interference, and covers essential requirements in the areas of EMC (Directive 2014/30/EU) and safety (Directive 2014/35/EU).

⁶ Under the Telecommunications (Radio-communication) Regulations, section 74-(1), IDA may take enforcement actions to eliminate or reduce interference caused by any electrical, electronic or radio-communication equipment.

harmonised with the CISPR 22/32 standard. IDA reiterates its support for harmonisation of standards, and that EMI measurements performed to regional/national implementation of the CISPR 22/32 standard (e.g. CENELEC⁷ EN 55032, KN 32, AS/NZS CISPR 32 or BSI EN 55032), including Subpart B of the FCC Part 15 may be acceptable, as an alternative to the CISPR 22/32 standard.

11 IDA agrees that alignment with the European EMC standard for radio equipment (ETSI⁸ EN 301 489-1) will serve to further enhance radio performance. IDA understands that this European EMC standard is like the CISPR 22/32 standard, which specifies conducted emission measurements at the DC power and AC mains ports and excludes radiated emission measurements (in-band, out-of-band and spurious emission limits defined in the ITU Radio Regulations and the European radio equipment standards). Collectively, radio equipment and EMC standards promote effective use of the radio spectrum and reduce risk of interference. The existing IDA EMC framework for ICT equipment does not differ from regional practices in requiring EMI measurements to conform to CISPR 22/32 or its equivalent, including radio-communication equipment that may come with dedicated AC mains port, external power supply or DC power port.

Electromagnetic Susceptibility (“EMS”) or Immunity Requirements

12 IDA agrees with the view that enforcement of the EMI (emission) requirements on ICT equipment should suffice in keeping any EMF phenomenon within tolerable limits. Hence, enforcement of the EMS (immunity) requirements generally on ICT equipment to enhance their resilience against EMI may not be necessary. Moreover, the Singapore market has prevailed on the expectation that equipment manufacturers and suppliers will bring in ICT equipment that will function as specified, with in-built immunity to interference.

13 However, for nationwide reception of the 2nd generation Digital Terrestrial Television Broadcasting (“DVB-T2”) transmission, IDA recognises the importance of the reception capabilities of these receivers in ensuring the efficient use of the radio spectrum, by way of resilience against interference. IDA deems it necessary to ensure that DVB-T2 receivers have minimum susceptibility to any EMF phenomenon that may exist in the home environment, and will require DVB-T2 receivers to comply with the radio frequency (“RF”) EMF immunity testing defined in the CISPR 20/24 standard.

Equipment Safety Requirements

14 IDA clarifies that the scope of the safety framework in this consultation includes all types of ICT equipment regardless of use of wired-line or wireless network connection, or its source of power supply (e.g. AC mains, external AC/DC converters, dedicated charger/power adapter, or DC power source). As in EMC assessment, the category of the ICT equipment, namely, fixed, vehicular or portable (with integral battery), will determine the applicability of safety requirements. The safety assessment of such equipment should verify that it has adequate protection against

⁷ CENELEC is the European Committee for Electrotechnical Standardization, responsible for creating market access standards at the European level, and adopting international standards wherever possible, through its close collaboration with the IEC.

⁸ “ETSI” is the European Telecommunications Standards Institute that produces globally applicable standards for ICT, including fixed, mobile, radio, converged, broadcast and Internet technologies.

risk of injury or damage due to electric shock, excessive temperature, mechanical instability or other possible hazards, although exposure to hazardous voltages from communications and power distribution infrastructures is unlikely in the home environment.

15 IDA understands that IEC advocates similar principles for designing safe equipment in both the IEC 60065/60950-1 and the IEC 62368-1 safety standards, although the latter focuses mainly on hazard-based safety engineering. Hence, IDA believes that IEC's development in this area, along with market forces, should be used to determine the timeline for switching from the existing prescriptive-based to a fully hazard-based approach for safety assessment of ICT equipment. IDA is of the view that this is likely to take place within the next three years as forecasted for the major markets (complete transition in Europe and North America by June 2019). Nevertheless, IDA will allow the local market to take its course or align with the IEC's timeline when there is one set for the withdrawal of the IEC 60065 and the IEC 60950-1 safety standards. IDA will continue to accept prescriptive-based safety testing of ICT equipment performed to the IEC 60065 or the IEC 60950-1 standard until IEC decides to revoke the validity of these two standards, and concurrently, will accept hazard-based safety testing of ICT equipment performed to the IEC 62368-1 standard.

Effective Date for Equipment Conformance

16 This consultation has enabled a review of the essential requirements for placing ICT equipment (wired-line and wireless) on the Singapore market. It has also re-affirmed IDA's position in aligning with ITU recommendations, IEC/CISPR and ETSI standards, and FCC regulations, in areas of EMC and safety assessment of ICT equipment and in recognising testing performed to regional/national implementation of these standards.

17 IDA will incorporate the revised EMC and safety requirements into all the IDA Technical Specifications established for conformity assessment of the various types of ICT equipment, under the generic section of "General Requirements" by 1 October 2016. IDA understands that the impact of these revisions to the industry is minimum, and a six-month transition period for the revisions to take effect should be adequate, i.e. the revisions will be in force by **1 April 2017**.

18 To summarise, the revised IDA EMC and safety framework for ICT equipment has re-established the following:

- (a) Compliance with EMI (emission) requirements based on the CISPR 13/22 or CISPR 32 standard shall be mandatory. Validity of the CISPR 13/22 standard will lapse by 31 March 2017, in line with IEC's deadline for withdrawing the CISPR 13/22 standard, and replacing it with the CISPR 32 standard. However, industry should note that the emission limits defined by IEC and adopted by IDA have not changed, and replacement of the former standard will not pose any forward nor backward compatibility issues between equipment tested to the former or the latter standard.

- (b) Compliance with EMS (immunity) requirements based on the CISPR 20/24 standard may be voluntary except for the RF EMF immunity test, which shall be applicable to DVB-T2 receivers.
- (c) Compliance with relevant requirements of the IEC 60065/60950-1 or the IEC 62368-1 safety standard shall be mandatory to reduce risk of hazards identified for the ICT equipment.

19 The tables of applicability of EMI, EMS and safety requirements (given in Annexes A to C) provide outlines for fixed, vehicular and portable ICT equipment compliance. The IDA Technical Specifications will incorporate these outlines accordingly, in the section of “General Requirements” along with the section of “Technical Requirements” specific to the ICT for equipment conformance with effect from 1 April 2017.

Applicability of EMI (Emission) Requirements

Phenomenon	Application	ICT Equipment Type Note 1				Reference standards Note 6
		Wired-line	Wireless / Radio and Ancillary			
			Fixed	Vehicular (DC supply)	Portable (integral battery)	
Electromagnetic Interference (EMI) or Emission Testing Requirement						
1. Radiated emission	Enclosure of equipment Note 2	M	C	C	C	Tables A.4 and A.5 [1]; §7.3 [2]; §10.2 [3] or §8.2 [4]
2. Conducted emission	DC power input/output port Note 3	C	C	M	NA	Table A.10 [1]; §7.3 [2]; §10.3 [3] or §8.3 [4]
	AC mains input/output port Note 4	C	C	NA	C	Table A.10 [1]; §10.4 [3] or §8.4 [4]
	Wired network port Note 5 , optical fibre port with metallic shield, broadcast receiver tuner port	C	C	C	C	Table A.12 and/or A.13 [1]; §7.3 [2]; §10.7 [3] or §8.7 [4]
Reference Standards						
[1]	IEC CISPR 32 (2015): Electromagnetic compatibility of multimedia equipment – Emission requirements					
[1a]	IEC CISPR 13 (2009): Sound and television broadcast receivers and associated equipment – Radio disturbance characteristics – Limits and methods of measurement					
[1b]	IEC CISPR 22 (2008): Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement					
[2]	ITU-T K.74 (2015): Electromagnetic compatibility, resistibility and safety requirements for home network devices					
[3]	ITU-T K.116 (2015): EMC requirements and test methods for radio telecommunication terminal equipment					
[4]	ETSI EN 301 489-1 (2011-09): EMC standard for radio equipment and services; Part 1: Common technical requirements					
Application Notes						
<p>“M” means that it shall be Mandatory for the equipment to comply with the requirement.</p> <p>“C” means that compliance with the requirement is Conditional, contingent on the relevance of application to equipment.</p> <p>“NA” means that the requirement is Not Applicable.</p>						
Note 1:	Equipment shall meet the Class B limits (§4 [1]). It may be a module internal, mounted, plug-in or external to a host system. Assessment is required with at least one representative of the host system (§6.2 [1]).					
Note 2:	This test is applicable to wired-line equipment, and ancillary equipment not incorporated in the radio equipment (Tables A.4 & A.5 [1]; §7.3 [2]; §10.2 [3]; or §8.2 [4]).					
Note 3:	This test is applicable to wired-line, radio and ancillary equipment for fixed use that may have DC cables longer than 3 m, and applicable for vehicular use irrespective of cable length (Table A.10 [1], §7.3 [2]; §10.3 [3] and §8.3 [4]). It applies to a DC power port that is not powered by a dedicated AC/DC power converter nor supporting communication that connects to a DC supply network (§3.1.12 [1]).					
Note 4:	This test is applicable to equipment that connects to the AC mains supply network. Equipment with a DC power port which is powered by a dedicated AC/DC power converter is defined as AC mains powered equipment (§3.1.1 [1]). Test is also applicable to mobile terminals with dedicated charger/power adapter [4].					
Note 5:	This test is applicable to equipment that has wired network port; broadcast receiver tuner port (Table A.12 [1]); and/or TV broadcast receiver tuner port (§3.1.8 [1]) with an accessible connector (Table A.13 [1]). Wired network port is used for voice, data and signalling transfers intended for connection to a communication network, e.g. CATV, PSTN, ISDN, ADSL, and LAN (§3.1.32 [1]). DC power ports supporting communications are considered to be wired network ports, e.g. Ethernet ports which include Power Over Ethernet (POE) (§3.1.12 [1]).					
Note 6:	Validity of the IEC CISPR 13 [1a] or CISPR 22 [1b] standard will lapse by 31 March 2017, in sync with IEC's deadline for withdrawing these two CISPR standards, and replacing them with the CISPR 32 [1] standard.					

Applicability of EMS (Immunity) Requirements

Phenomenon	Application	ICT Equipment Type				Reference standards
		Wired-line	Wireless / Radio and Ancillary			
			Fixed	Vehicular (DC supply)	Portable (integral battery)	
Electromagnetic Susceptibility (EMS) or Immunity Testing Requirement						
1. RF electromagnetic field Note 1 (80 MHz to 1 GHz and 1.4 GHz to 6 GHz)	Enclosure of equipment	V (80 MHz to 1 GHz)	V	V	V	\$4.6 [1]; \$4.2.3.2 [2]; \$7.3 [3]; \$11.2 [4]; or \$9.2 [5]
2. Electrostatic discharge	Enclosure of equipment	V	V	V	V	\$4.7 [1]; \$4.2.1 [2]; \$7.3 [3]; \$11.3 [4]; or \$9.3 [5]
3. Fast transients common mode Note 2	Signal/control, wired network, DC and AC power input ports	V	V	V	V	\$4.3, \$4.5 [1]; \$4.2.2 [2]; \$7.3 [3]; \$11.4 [4]; or \$9.4 [5]
4. RF common mode 0.15 MHz to 80 MHz Note 2	Signal/control, wired network, DC and AC power input ports	V	V	V	V	\$4.3, \$4.5 [1]; 4.2.3.3 [2]; \$7.3 [3]; \$11.5 [4]; or \$9.5 [5]
5. Transients and surges, vehicular environment Note 3	DC power input ports	NA	NA	V	NA	\$11.6 [4]; \$9.6 [5]; or ISO 7637-2 [6]
6. Voltage dips and interruptions	AC mains power input ports	V	V	NA	V	4.2.6 [2]; \$7.3 [3]; \$11.7 [4]; or \$9.7 [5]
7. Surges, common and differential mode	AC power input ports, wired network ports	V	V	NA	V	4.2.5 [2]; \$7.3 [3]; \$11.8 [4]; or \$9.8 [5]
Reference Standards						
[1]	IEC CISPR 20 (2006): Sound and television broadcast receivers and associated equipment – Immunity characteristics – Limits and methods of measurement; or the equivalent IEC 61000-4 series of immunity standards					
[2]	IEC CISPR 24 (2010): Information technology equipment – Immunity characteristics – Limits and methods of measurement; or the equivalent IEC 61000-4 series of immunity standards					
[3]	ITU-T K.74 (2015): Electromagnetic compatibility, resistibility and safety requirements for home network devices					
[4]	ITU-T K.116 (2015): EMC requirements and test methods for radio telecommunication terminal equipment					
[5]	ETSI EN 301 489-1 (2011-09): EMC standard for radio equipment and services; Part 1: Common technical requirements					
[6]	ISO 7637-2 (2004): Road vehicles - Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only					
Application Notes						
“V” means that compliance with the requirement is Voluntary , and “NA” means the requirement is Not Applicable .						
Note 1:	RF EMF immunity test (80 MHz to 1 GHz) shall be applicable to all types of DVB-T2 receiver (fixed, vehicular or portable).					
Note 2:	These tests should be applicable to ICT equipment that comes with ports as listed (including TV broadcast receiver tuner port) with cables longer than 3 m. Test should also be applicable to mobile terminals with dedicated charger/power.					
Note 3:	These tests should be applicable to DC supply voltage input ports of mobile radio and ancillary equipment, intended for mobile use in vehicles (nominal 12V and 24V).					

Applicability of Equipment Safety Testing Requirements

Phenomenon	Application Note 1	ICT Equipment Type				Reference standards
		Wired-line	Wireless / Radio and Ancillary			
			Fixed	Vehicular (DC supply)	Portable (integral battery)	
Equipment Safety Testing Requirement						
Overvoltage from telecommunication networks is not possible Note 2	Ports with SELV or TNV-0	C	C	M	C Note 3	IEC 60950-1 [1]; IEC 60065 [2]; IEC 62368-1 Note 4 [3]
	Ports with TNV-2	C	C	NA	C Note 3	or §7.2 [4]
Reference Standards						
[1]	IEC 60950-1 (2013): Information technology equipment – Safety – Part 1: General requirements					
[2]	IEC 60065 (2014): Audio, video and similar electronic apparatus - Safety requirements					
[3]	IEC 62368-1 ed.2 (2014): Audio/video, information and communication technology equipment – Part 1: Safety requirements					
[4]	ITU-T K.74 (2015): Electromagnetic compatibility, resistibility and safety requirements for home network devices					
Application Notes						
<p>“NA” means the requirement is Not Applicable.</p> <p>“M” means that it shall be Mandatory for the equipment to comply with the requirement.</p> <p>“C” means that compliance with the requirement is Conditional, contingent on the relevance of application to equipment.</p>						
Note 1: Defined in [1]	<p>Hazardous Voltage: A voltage that exceeds 42.4 V peak or 60 V dc.</p> <p>SELV: Safety Extra-Low Voltage refers to voltages not exceeding 42.4 V peak or 60 V dc under normal operating conditions.</p> <p>TNV circuit: A circuit in the equipment to which the area of contact is limited, designed and protected, that voltage does not exceed specified limits, under normal operating conditions.</p> <p>TNV-1: Voltages do not exceed SELV, <u>subject to overvoltage from telecom networks.</u></p> <p>TNV-2: Voltages exceed SELV, not subject to overvoltage from telecom networks.</p> <p>TNV-3: Voltages exceed SELV, <u>subject to overvoltage from telecom networks.</u></p>					
Defined in [2]	<p>Hazardous Voltage: A voltage that exceeds the safe value of 35 V peak or 60 V dc.</p> <p>TNV-0: Voltages do not exceed the safe value under normal operating conditions, and not subject to overvoltage from telecom networks.</p> <p>TNV-1: Voltages do not exceed the limits for a TNV-0 circuit, subject to overvoltage from telecom networks.</p> <p>TNV-2: Voltages exceed a TNV-0 circuit, not subject to overvoltage from telecom networks.</p> <p>TNV-3: Voltages exceed a TNV-0 circuit, subject to overvoltage from telecom networks.</p> <p>The requirements of IEC 60950-1 [1] may also be used to meet the requirements for safety of multimedia equipment.</p>					
Note 2:	When designing ICT equipment or network devices for use in home environments according to IEC 60950-1 [1], IEC 60065 [2] or IEC 62368-1 [3], manufacturers may assume that customer buildings or premises meet the qualifying conditions for equipment resistibility to overvoltage up to 1.5 kV. There should be overvoltage protection installed at the network and power termination points together with earthing and bonding techniques (according to ITU-T K.66 for protection of customer premises from overvoltage).					
Note 3:	Requirement is applicable to portable or mobile terminals with dedicated external power supply (charger/power adapter).					
Note 4:	<p>IEC 62368-1 [3] is a product safety standard that classifies energy sources, prescribes safeguards against those energy sources, and provides guidance on the application of, and requirements for those safeguards.</p> <p>The standard is to be applied using the hazard-based approach:</p> <ol style="list-style-type: none"> Identify energy sources in the product; Classify energy sources (effect on the body or combustible material, e.g. possibility of injury or ignition); Identify safeguards for protection from energy sources that may cause injury or damage; and Qualify safeguards as effective using compliance criteria or requirements defined in the standard. 					