

Radio Spectrum and Technical Standards Advisory Committee

SSAC Paper 13/2013 EMC Requirements for Electrical and Electronic Apparatus

Office of the Communications Authority

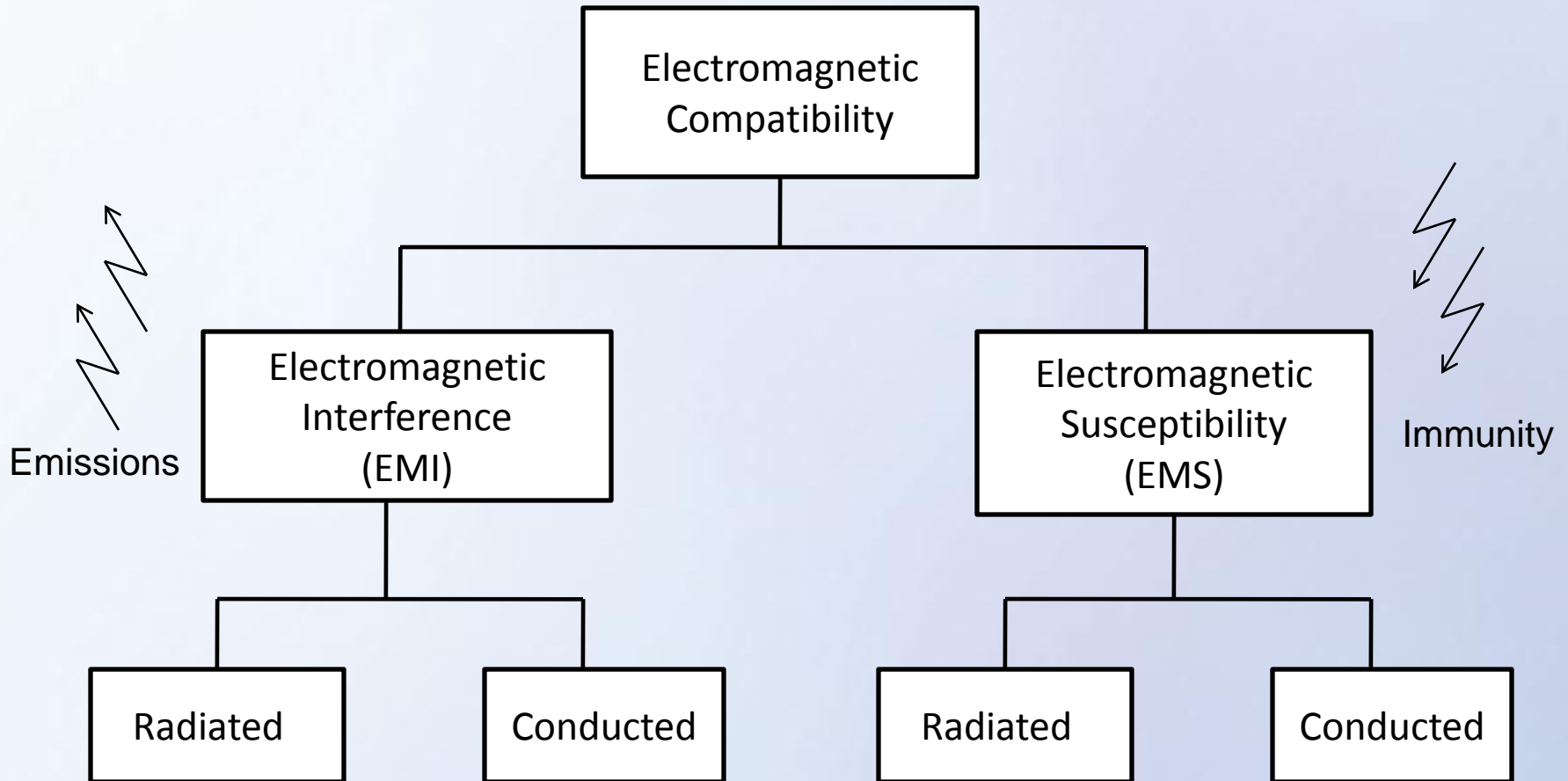
Date: 12 September 2013

Definition

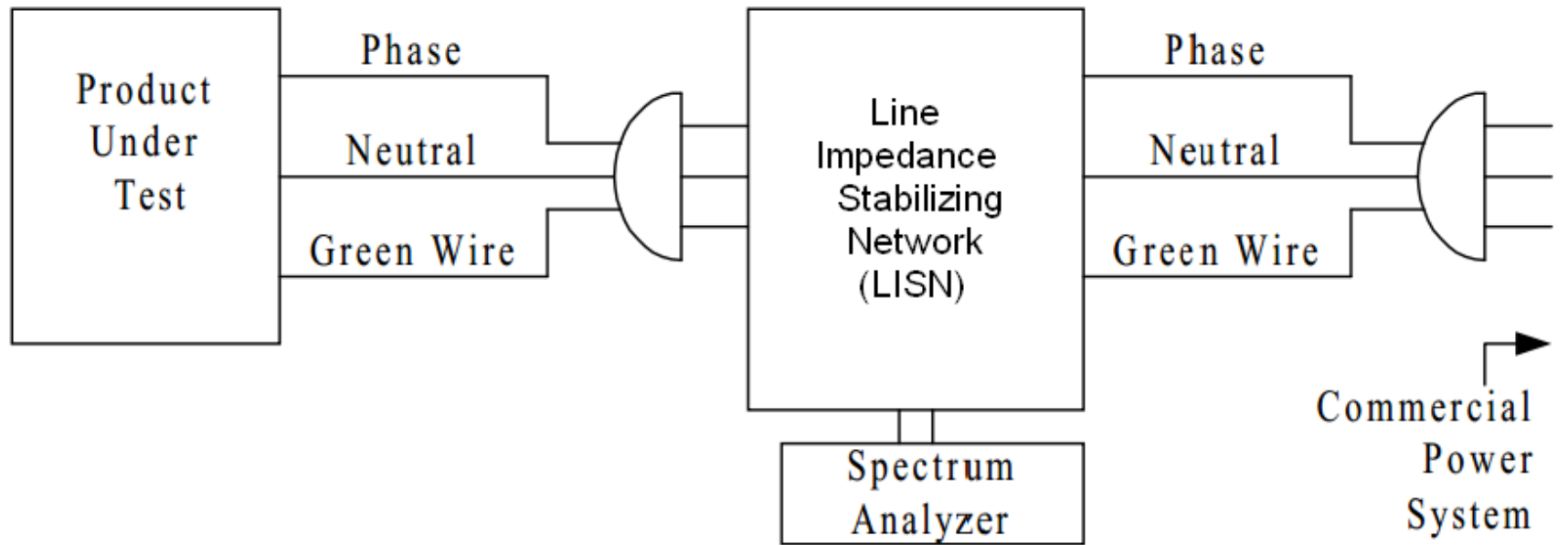
- EMC : Electromagnetic Compatibility

"The ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment."

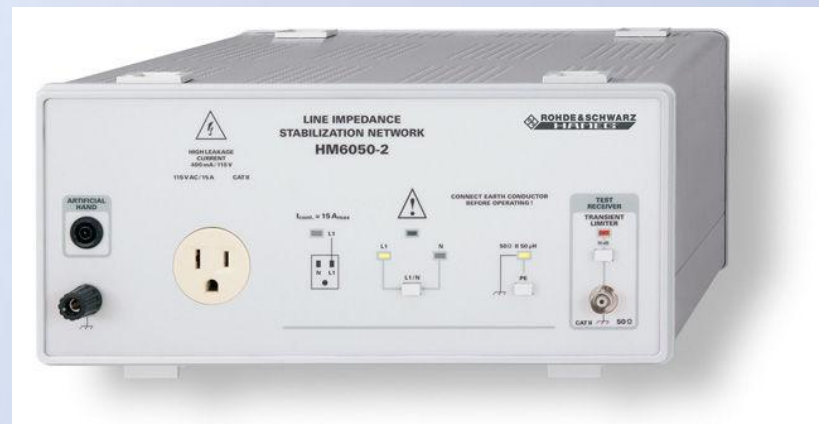
EMC Aspects



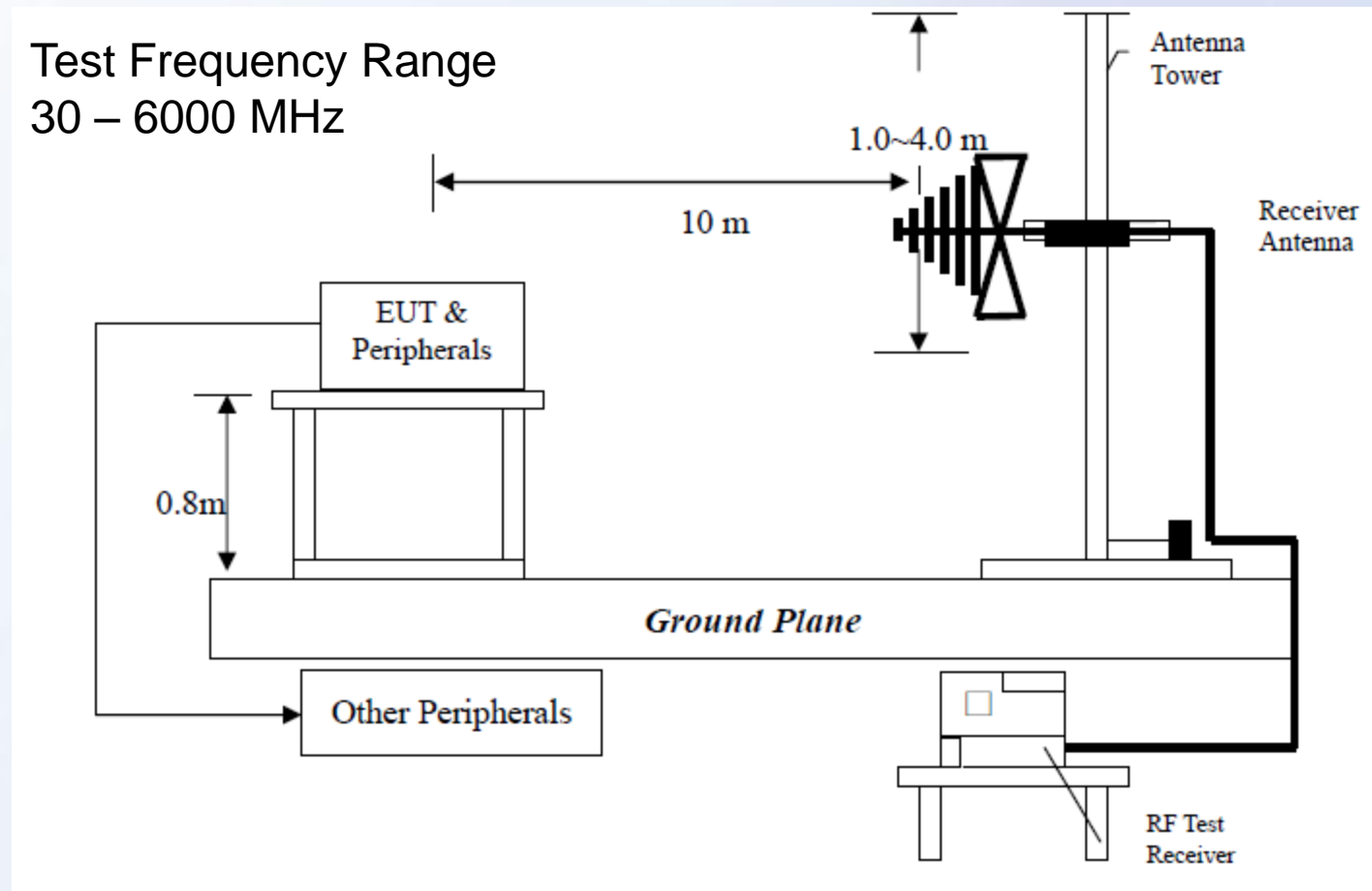
Conducted Emission Test



Test Frequency Range :
150 kHz – 30 MHz



Radiated Emission Test



Where comes EMI

- Every electronic apparatus that has an oscillator produces EM disturbances
- Motor brushes of electrical apparatus generate EM disturbances
- Electro-mechanical components induce EM disturbances in the make-break switching operation
- Power and signals in apparatus, printed circuit boards, wires and cables leak EM waves

EMI Mitigation

Radiated EMI Mitigation

- Shielding
- Circuit Design
- Cable Selection and Layout

Conducted EMI Mitigation

- Grounding
- Filters, Ferrites, isolation transformer, optical isolation etc.

EMC Regulations

- To prevent the supply and use of apparatus that would cause unacceptable interference to communication services
- EMC regulatory regime requires suppliers to ensure apparatus meet the applicable standards before supply to the market
- Compliance with immunity standards is not required in many countries (e.g. US, HK, Japan)
- Spectrum regulators have the authority to stop the use of apparatus which interferes with communication services

EMC Standards

- Prevailing standards

Region	Standards/ Bodies
International	EMC standards set by the International Electrotechnical Commission (IEC) and the International Special Committee on Radio Interference (CISPR).
European EMC Standards	EN standards developed by the European Committee for Electrotechnical Standardization (CENELEC)
US	CFR Part 15 Subpart B by the Federal Communications Commission (FCC)

- International and European EMC standards are harmonized as many EN standards are based on IEC and/or CISPR standards

EMC Requirements for Electrical and Electronic Apparatus in HK

- Chapter 106B Telecommunications (Control of Interference) Regulations regulates radiated and conducted emissions of the following classes of apparatus :

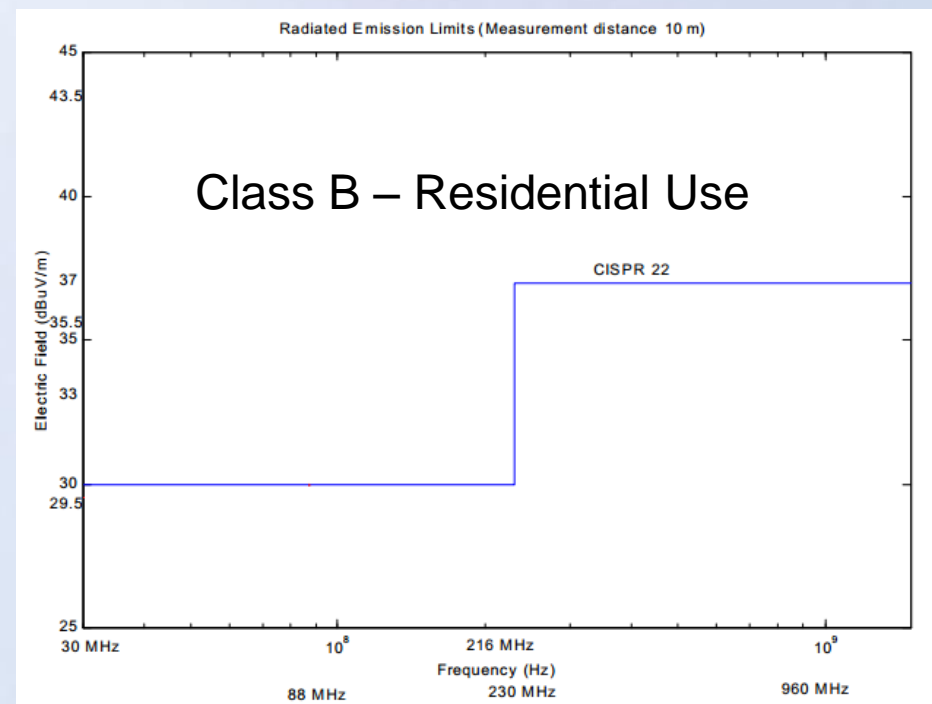
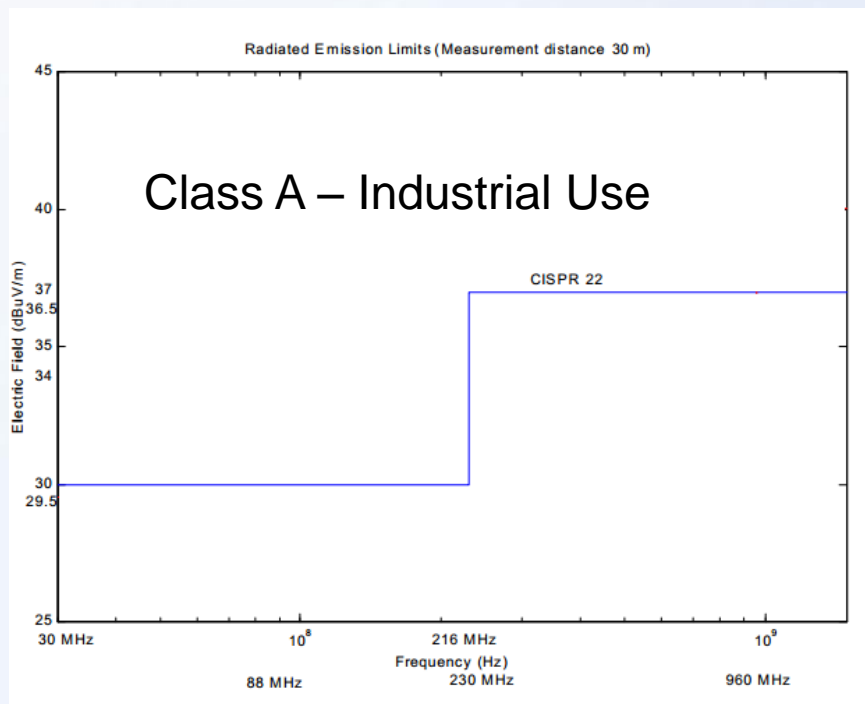
Apparatus	Applicable Standard
Ignition apparatus of internal combustion engines	CISPR 12
Information technology equipment	CISPR 22
Sound and television broadcast receivers and associated equipment	CISPR 13
Fluorescent lamps and luminaires	CISPR 15
Household electrical appliances and similar electrical apparatus, and portable tools	CISPR 14-1

EMC Regulatory Provisions in Chapter 106B

- Regulates manufacturers, suppliers, assemblers and importers of electrical and electronic apparatus
- Adopted essentially CISPR standards to control the conducted and radiated emission levels,
- CA might determine the test methods
- No immunity requirement is adopted in Chapter 106B

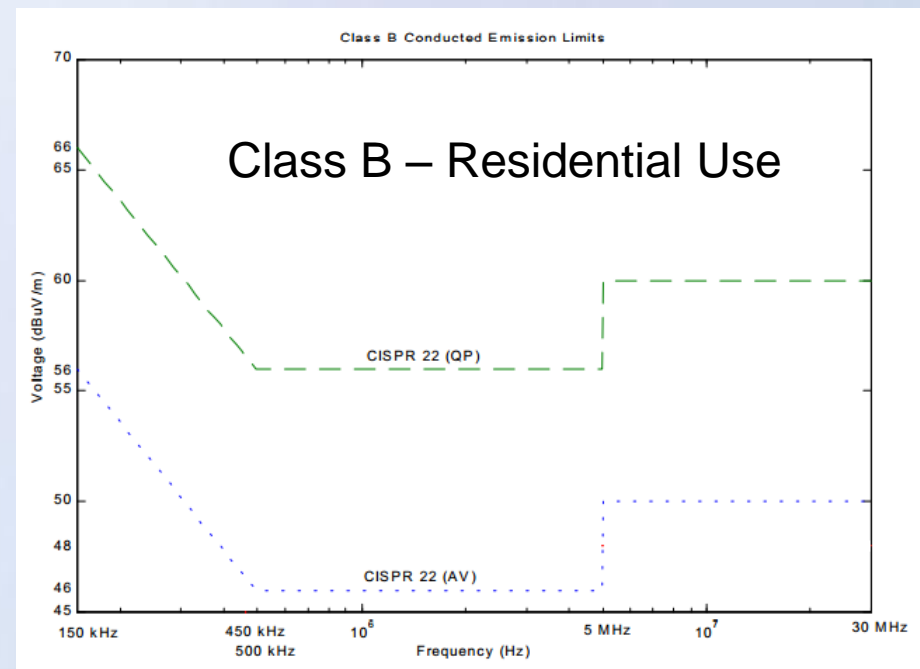
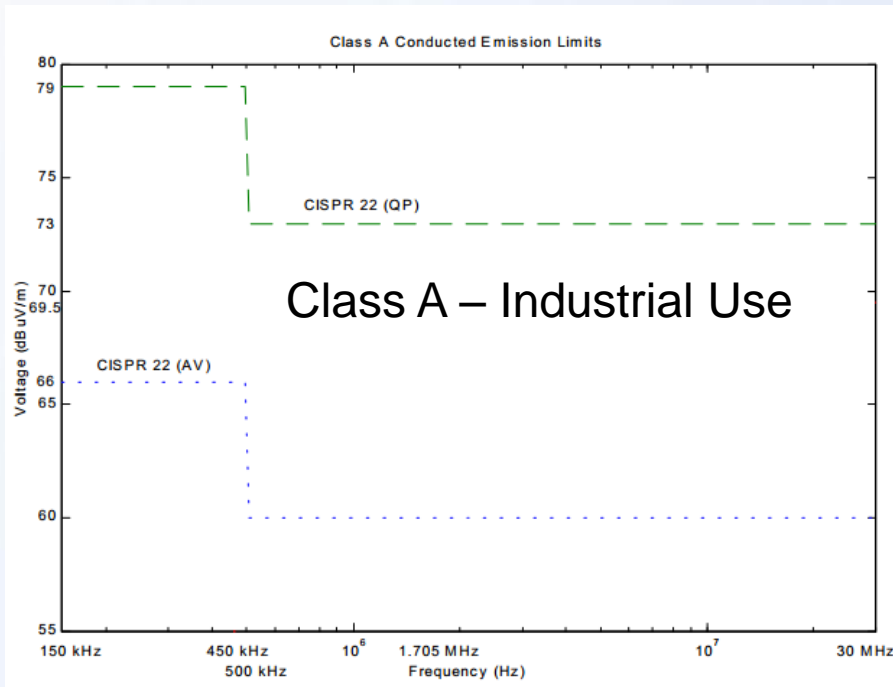
CISPR22 – IT Equipment (1)

Limits of Radiated Emissions In CISPR 22



CISPR22 – IT Equipment (2)

Limits of Conducted Emissions In CISPR 22



Amendments to Chapter 106B

- To cater for new apparatus in the market such as electrical vehicles, LED lights etc
- New apparatus comply with other regional or national standards other than CISPR standards
- To align with the widely recognised standards, for each class of apparatus, compliance with any one of the following standards would be acceptable
 - up-to-date CISPR standards
 - European harmonised standards (EN standards)
 - National standards of the PRC (GB standards)
 - Code of Federal Regulations (CFR) of Federal Communications Commission (FCC) of the USA

Conclusion

- EMC should be treated as an integral part of product design, instead of patches when problems arise
- EMC will be more and more important due to the proliferation of electronic apparatus
- Chapter 106B will be amended to cater for new apparatus and market development
- OFCA will continue to monitor development of international, regional and national EMC standards

Thank You !