Experience with noise emission declarations and labels

Information Technology Industry

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Acknowledgement: IT industry colleagues

Introduction

Millions of units – PC worldwide 68 M in Q2'15[1]

Performance, cost, size & acoustic considerations

Acoustic drivers:

- Usage model aspects:
  - Server, desktop, notebooks, printers, consumer electronics
  - Environment
- Customer expectations:
  - Product quality, service calls
- Eco labels & purchase specifications:
  - Blue Angel, Nordic Swan, Statskontoret, …
  - Criteria lowered by >10 dB over last 15 years
- Competition:
  - EU regulation 617/2013: publish noise emission values

[1] Gartner, July 2015, - Data includes desk-based PCs, notebook PCs and ultra mobile premium

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Introduction

IT industry well organized:

- Trade association ITI TC6
- ECMA TC 26 acoustics group
- INCE technical committee
- ANSI S12 WG3
- ISO TC43/SC1/WG23
- JBMIA

Harmonized standards & public information:

- ISO 7779, ECMA-74, ISO 9296, ECMA 109
- Eco declaration ECMA 370

Introduction

ECMA
EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION

- 37 -

D.7.2   Tabletop personal computers

Declared noise emission values:

Operating	Sample size:	N = 43	N = 24
	Mean value:	L_{WAd} = 5,2 B	L_{pAm} = 37,8 dB
	Stand.dev.:	s = 0,30 B	s = 3,1 dB
Idling	Sample size:	N = 29	N = 25
	Mean value:	L_{WAd} = 4,9 B	L_{pAm} = 35,8 dB
	Stand.dev.:		s = 2,8 dB

Individual values are plotted in figures D.23 and D.24.
Statistically, 68% of the values are within the following limits:

Tabletop personal computers	L_{WAd} (B)	L_{pAm} (dB)
Disk Operation	4,9 - 5,5	35 - 41
Idling	4,7 - 5,2	33 - 39

● THE ECO ☘ DECLARATION
●ecma INTERNATIONAL

Ecma/TC38-TG3/2015/026
(Rev. 1 – 15 April 2015)

Annex B2 - Product environmental attributes
Computers and computer monitors

The declaration may be published only when all rows and/or fields marked with * are filled-in (n.a. for not applicable).
Additional information regarding each item may be found under P15.

Brand *		Logo
Company name *		
Contact information * e-mail address		
Internet site *		
Additional information		

The company declares (based on product specification or test results based obtained from sample testing), that the product conforms to the statements given in this declaration.

Type of product *	
Commercial name *	
Model number *	
Issue date *	
Intended market *	☐ Global ☒ Europe ☐ Asia, Pacific & Japan ☐ Americas ☐ Other
Additional information	

This is an uncontrolled copy when in printed form. Please refer to the contact information for the latest version.

P9.2*	Information about the energy save function is provided with the product.			☐ ☐ ☐
P9.3	Energy efficiency class (monitors only):			☐

P10	**Emissions**		
	Noise emission – Declared according to ISO 9296 (See NOTE B9)		
P10.1	Mode	Mode description	Statistical upper limit A-weighted sound power level, $L_{WA,c}$ (B)
	Idle	*	* ☐
	Operation	*	* ☐
	Other mode		

Measured according to: ☐ ISO 7779 ☐ ECMA-74
☐ Other   (only if not covered by ECMA-74)

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Technology innovations

Source:

- Processor & component energy efficiency → low noise, increased battery life, thin/light systems, high performance, fanless systems

- Power management

- Fan & hard drive design

- Solid state drives

- Advanced sensing and fan control

- Printer, server designs & efficiencies
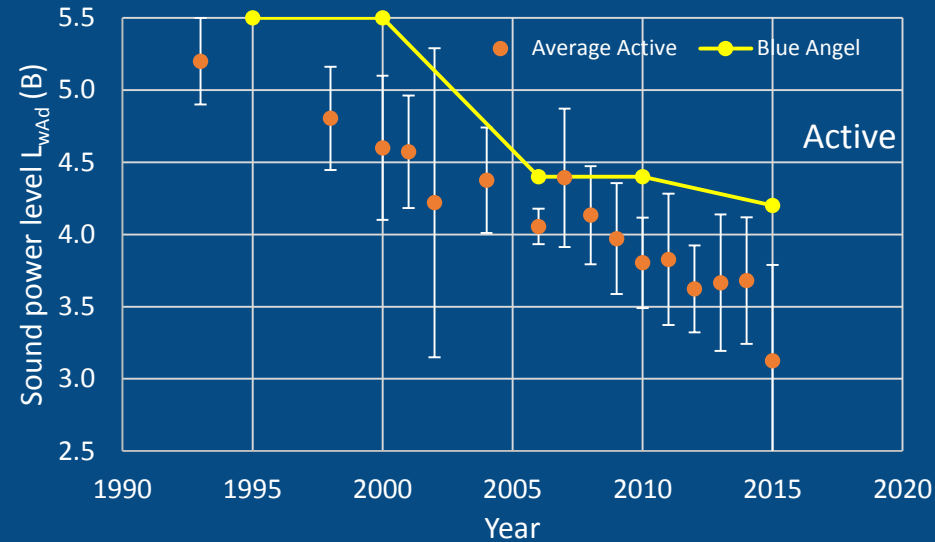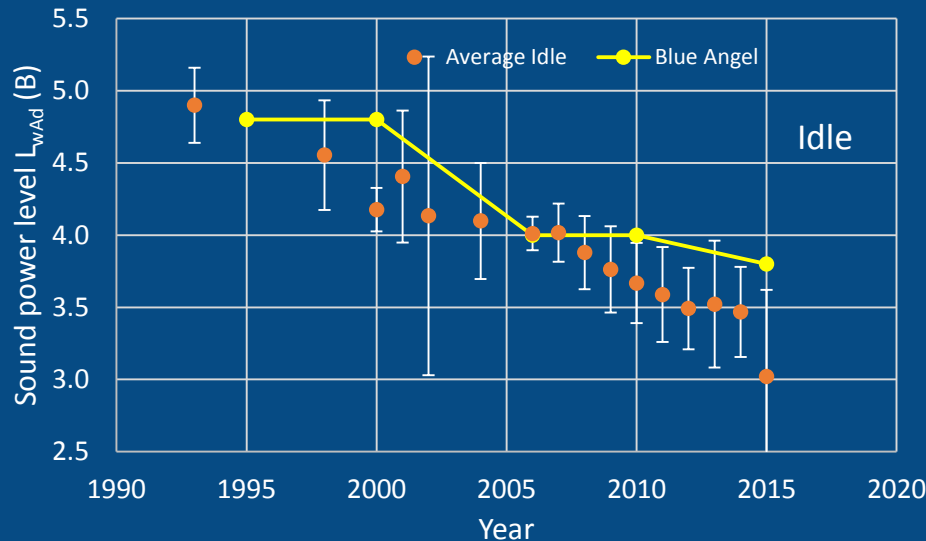
Transmission:

- HDD enclosure technologies

Receiver:

- Sound quality optimizations

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Quieter products

Example: desktop acoustic noise trend[1,2]:

- Large variations exist due to models, manufacturers etc

Products quieter by more than 10 dB

Noise levels comparable to environment background [3]

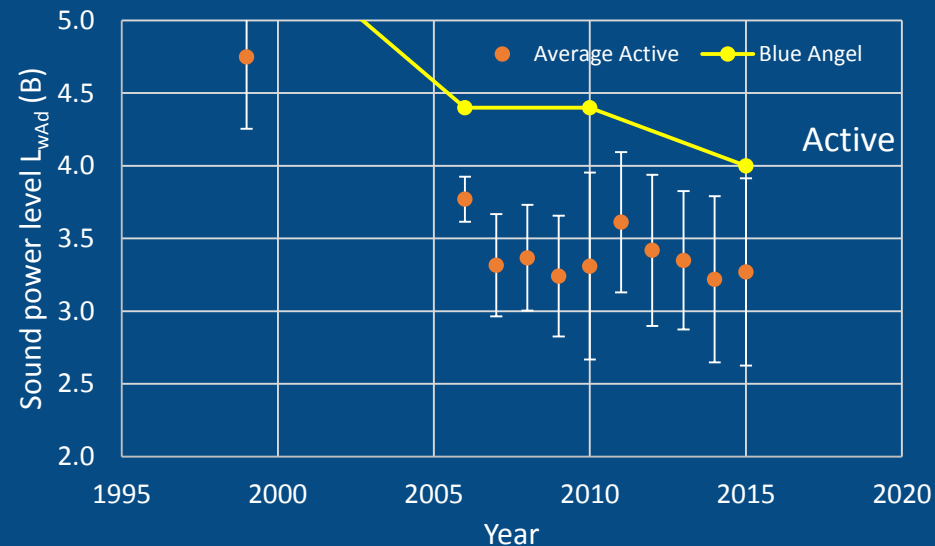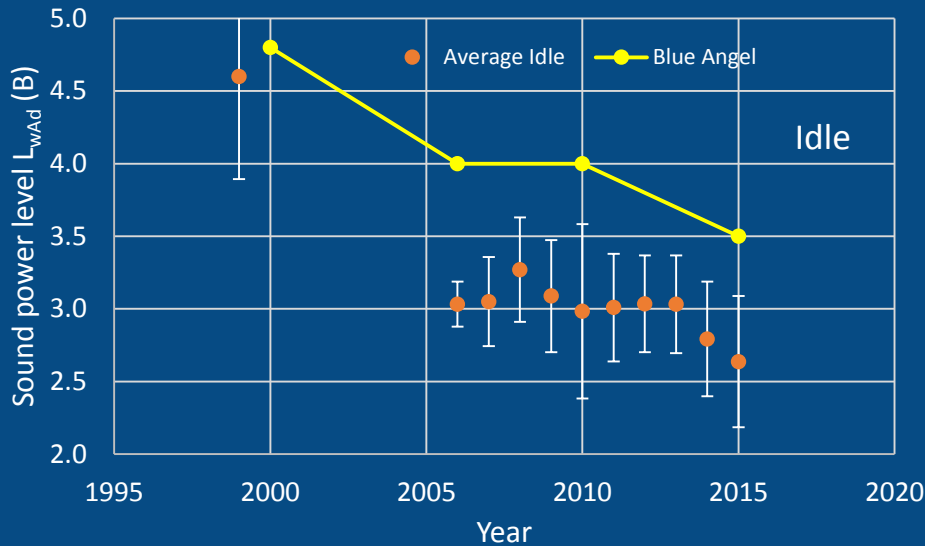[1] Data sheets, ECMA TR-62, internal measurements

[2] R.D.. Hellweg, E.K. Dunens, T. Baird, "Requirements for Information Technology (IT) Equipment Noise", InterNoise 2005

[3] R. Doherty, E. Salskov, P. Corriveau, P. Sorenson, D. Gabel, W.M. Beltman, "Background noise levels in PC home environments", NoiseCon 2005, Baltimore, U.S.A.

Quieter products

Example: notebook acoustic noise trend[1]:

- Large variations exist due to models, manufacturers etc

Products quieter by ~5 dB (idle)

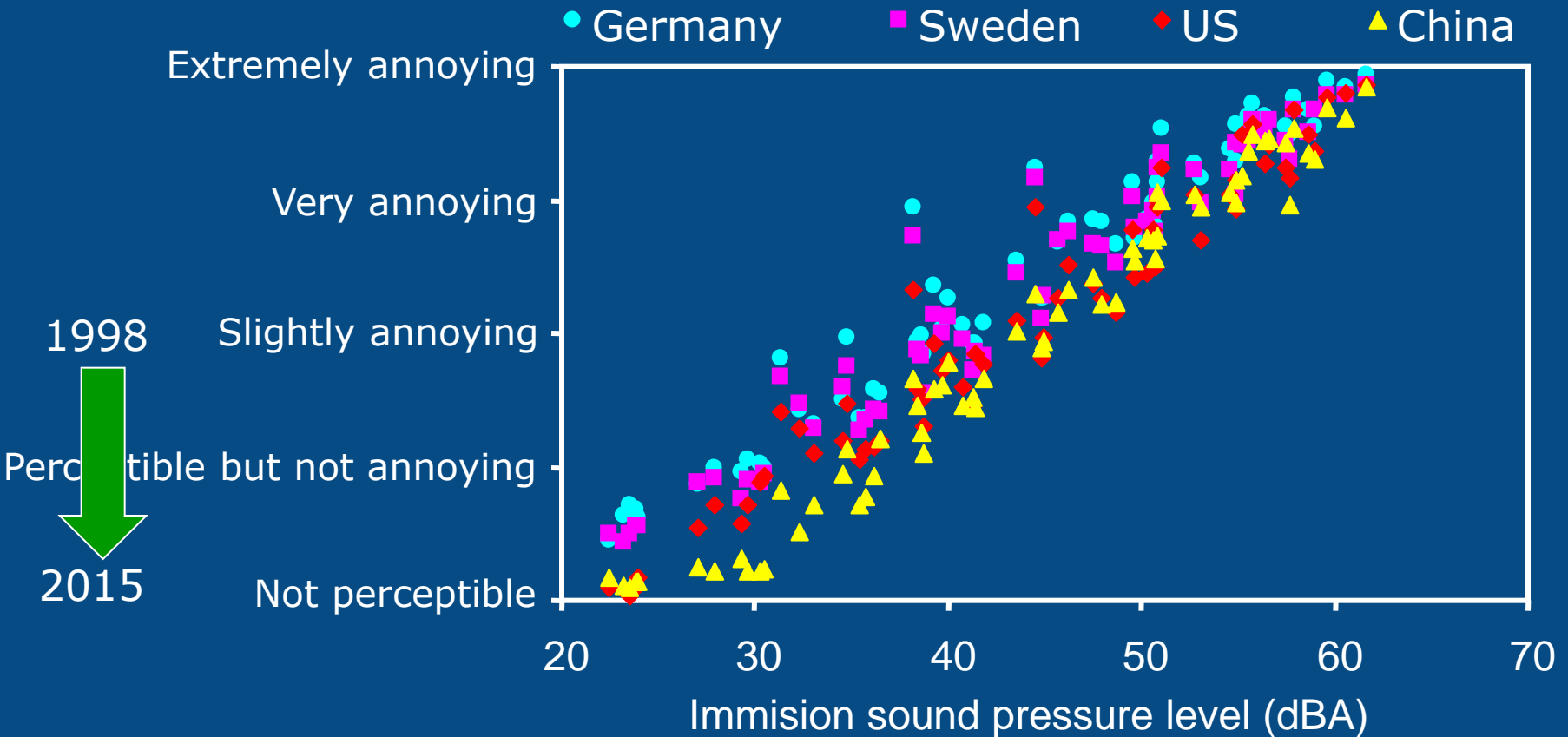Noise levels comparable to environment background [2]

Impact

Impact of lower levels on perception[1]

Legend: ● Germany   ■ Sweden   ◆ US   ▲ China

Y-axis (top to bottom): Extremely annoying, Very annoying, Slightly annoying, Perceptible but not annoying, Not perceptible

X-axis: Immision sound pressure level (dBA) — 20, 30, 40, 50, 60, 70

1998 → 2015

[1] R. Doherty, E. Salskov, P. Corriveau, P. Sorenson, D. Gabel, W.M. Beltman, Human annoyance levels to PC sounds in the home background noise environment, InterNoise 2006, Honolulu, Hawaii, U.S.A.
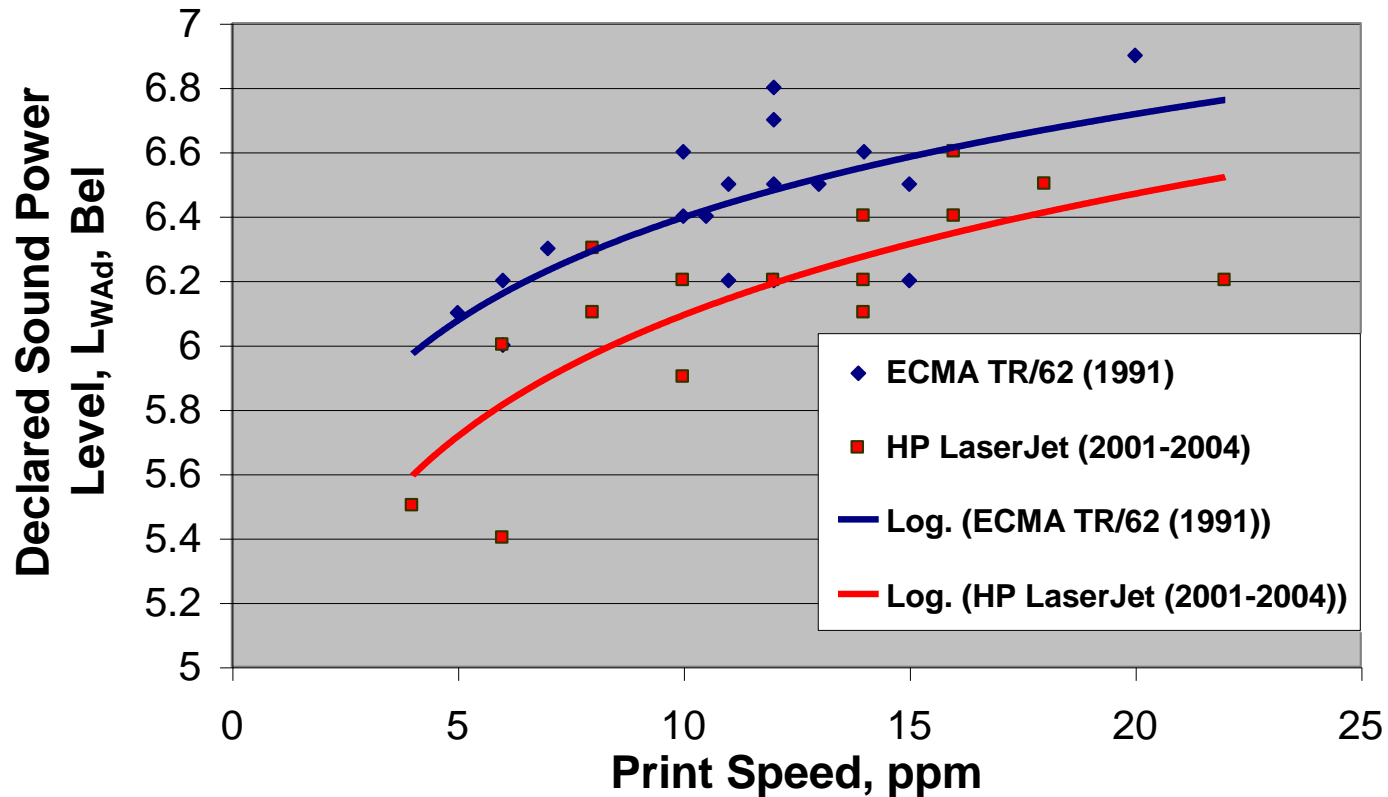
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Summary

- IT products much quieter, with higher performance:
  - \> 10 dB on average from 1998 → 2015
  - Perception: slightly annoying → not perceptible
- Impacts hundreds of millions of people worldwide
- Innovation vectors:
  - Energy efficient processors & components, fanless systems
  - Solid state drives
  - Enhanced printer, fan, hard drive & enclosure designs
  - Advanced control techniques
- Noise emission data available to the public:
  - Harmonized IT standards framework worldwide
  - Environmental declarations

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Laser Printers: ECMA TR/62 (1991) Versus HP LaserJets (2000-2004)

[1] R.D.. Hellweg, E.K. Dunens, T. Baird, "Requirements for Information Technology (IT) Equipment Noise", InterNoise 2005