

Measurement of Commercially Available Solid State Lighting Products: UK Round Robin

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What's the big idea?

The benefits of SSL
www.m4ssl.npl.co.uk

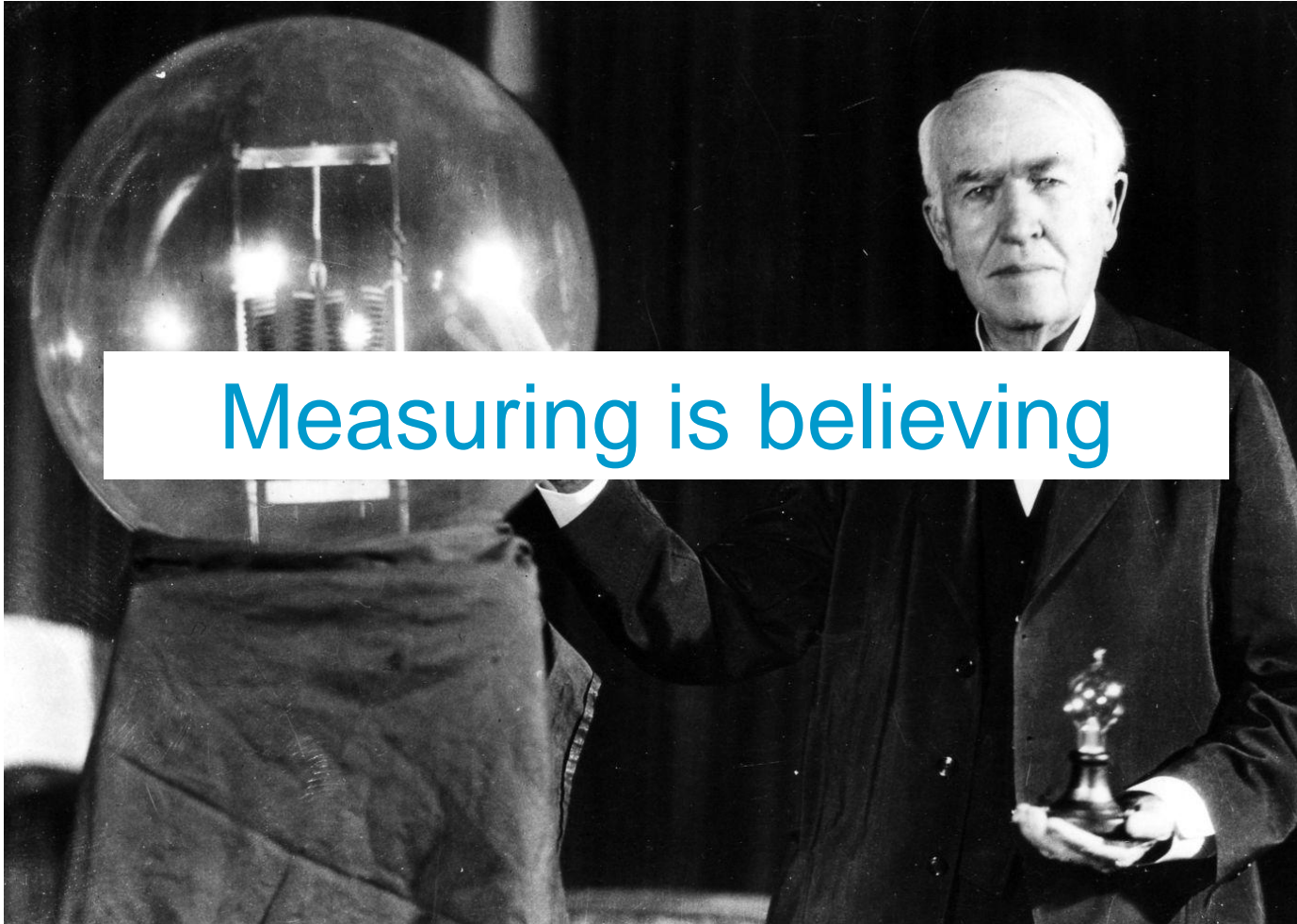


“25 year lifetime
LED bulb”
www.amazon.co.uk

“LEDs are 10 times as
efficient as
conventional lighting”
www.bbc.co.uk/news

“600lm LED
equivalent to 60W
light bulb”
www.which.co.uk

Seeing is believing?



Measuring is believing

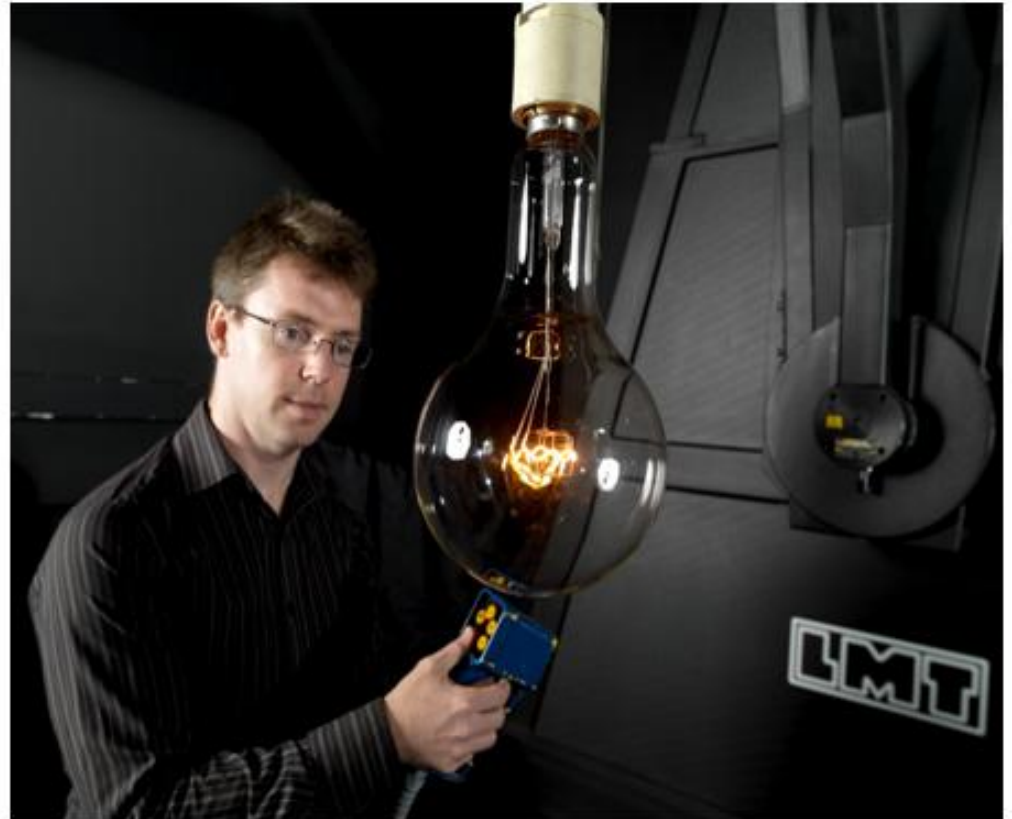
Aims

- Intercomparison of measurements in the UK
- Commercially available SSL products
 - Non-directional, directional, linear and incandescent
- Measurements
 - luminous flux
 - power, voltage, current, power factor
 - luminous efficacy
 - Colour quantities - CCT, CRI(Ra), x and y
- No guidance given on methods

Measurement challenges



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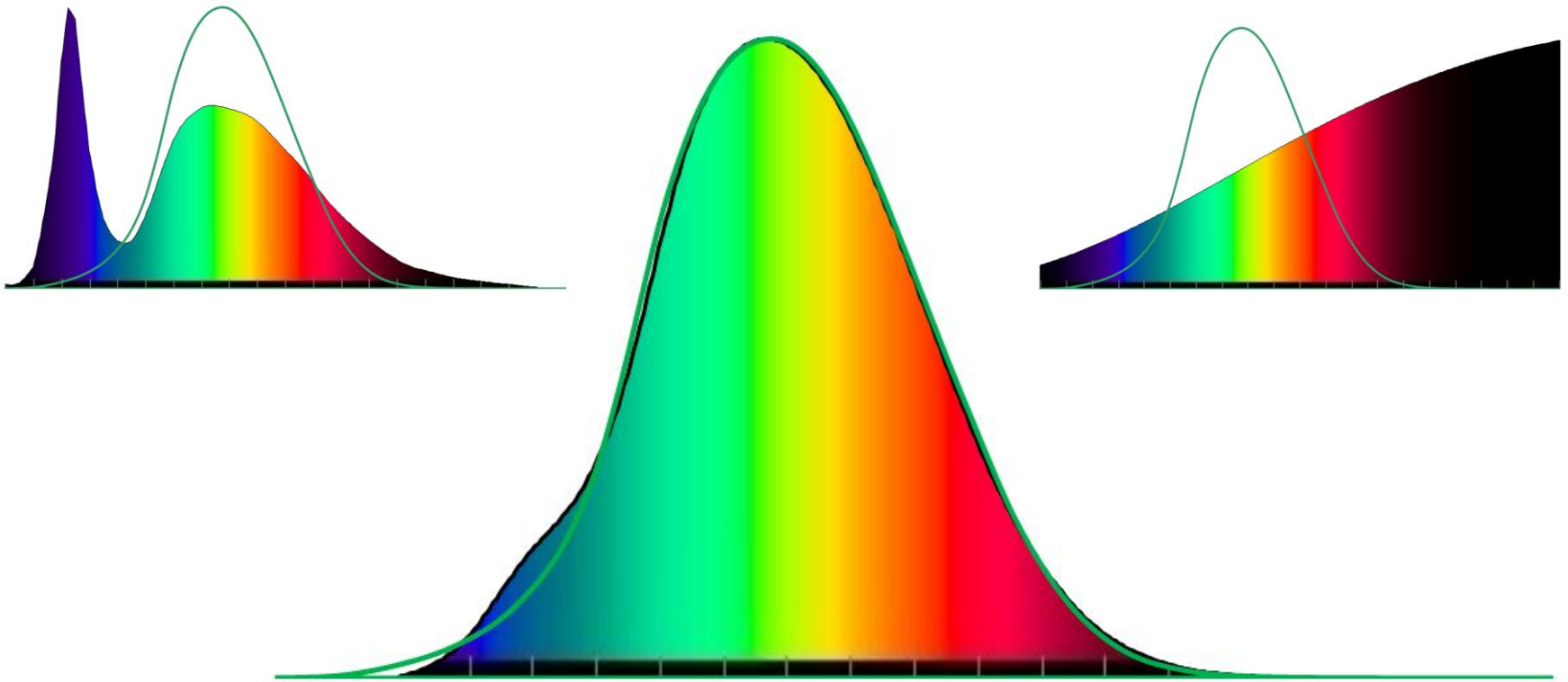




National
Measurement
System



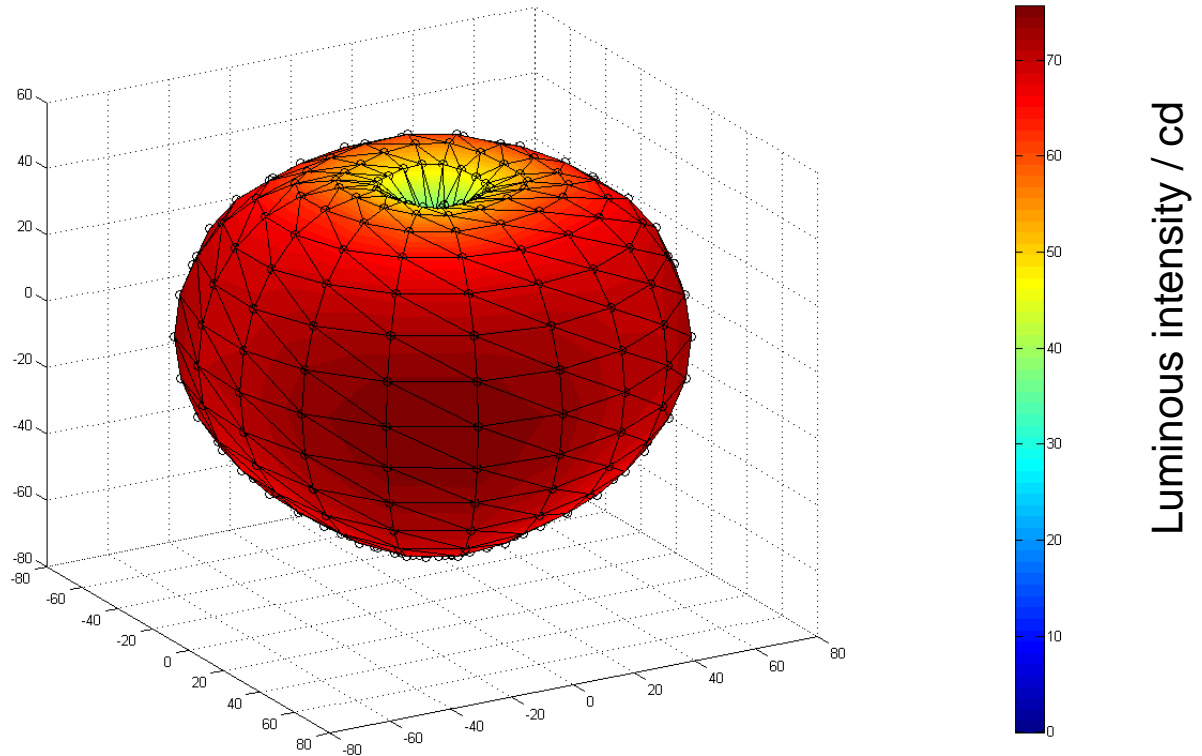
Spectral



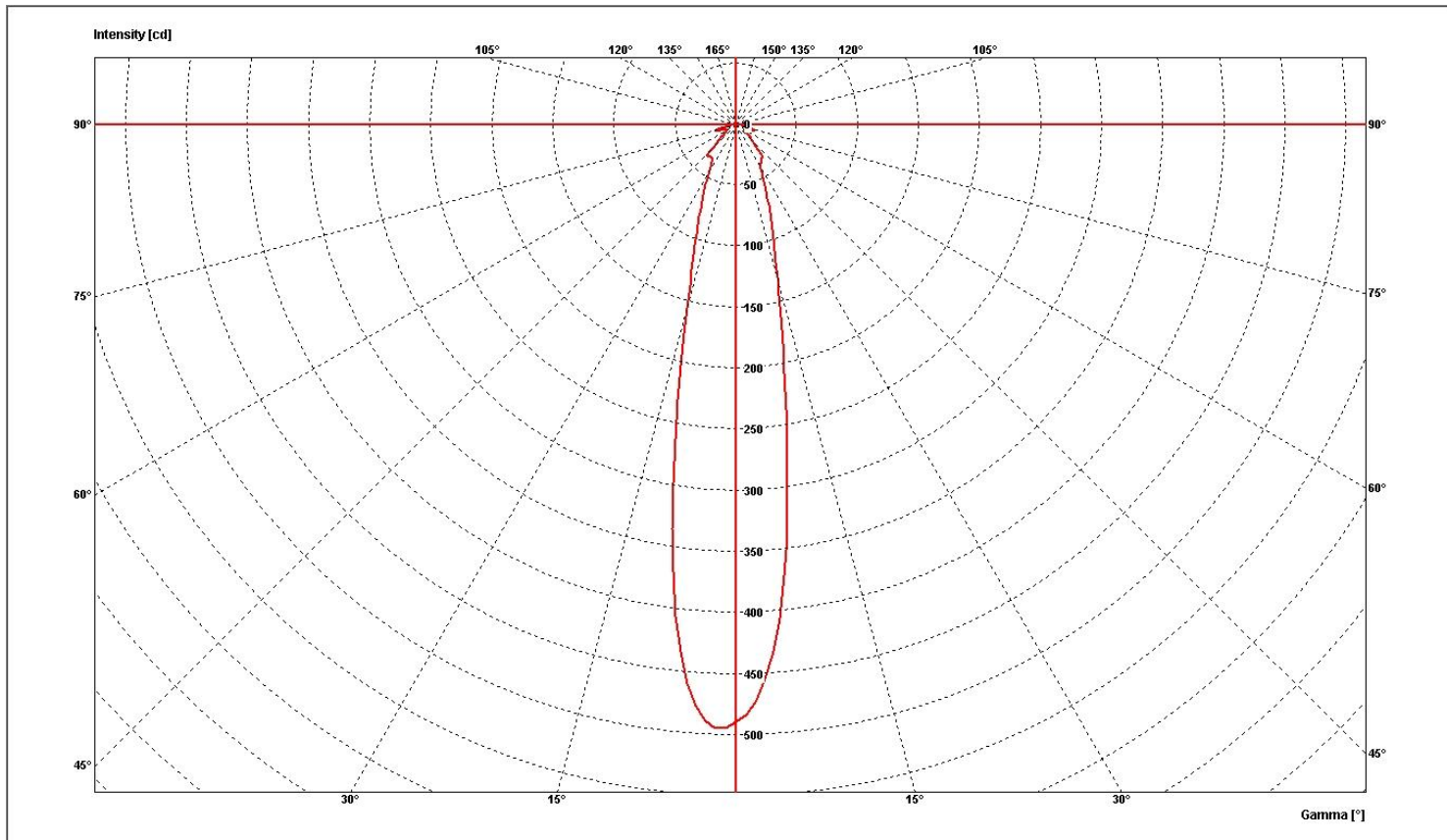
Commercially Available Solid State Lighting Products



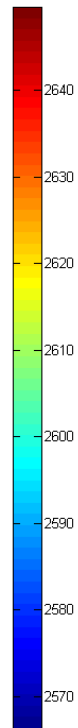
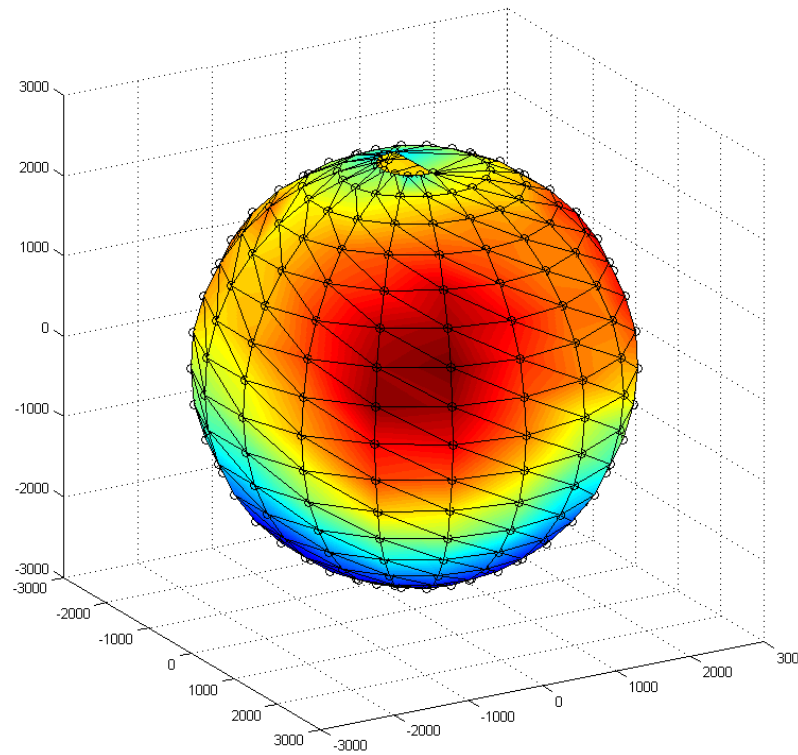
Luminous intensity distribution



Luminous intensity distribution



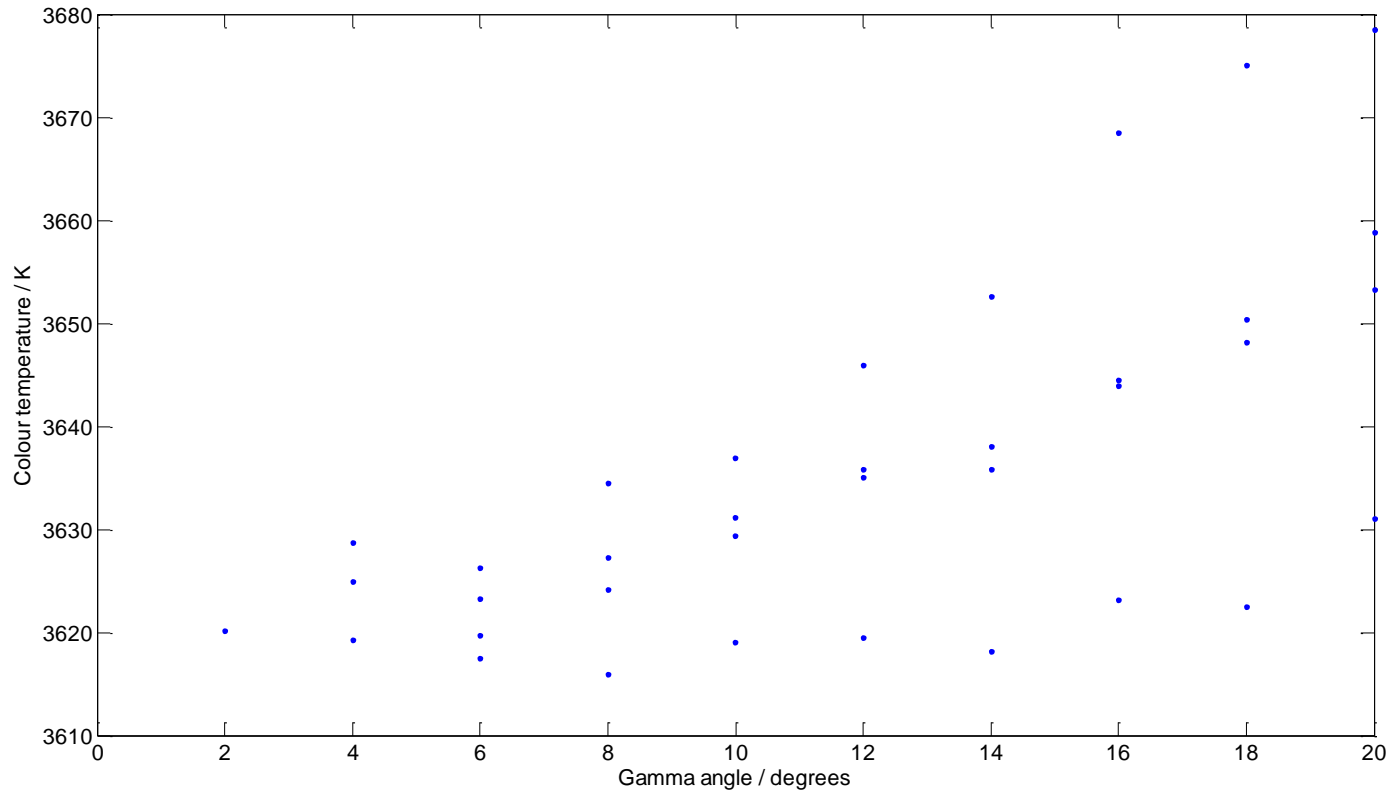
Correlated colour temperature



Correlated colour temperature / K



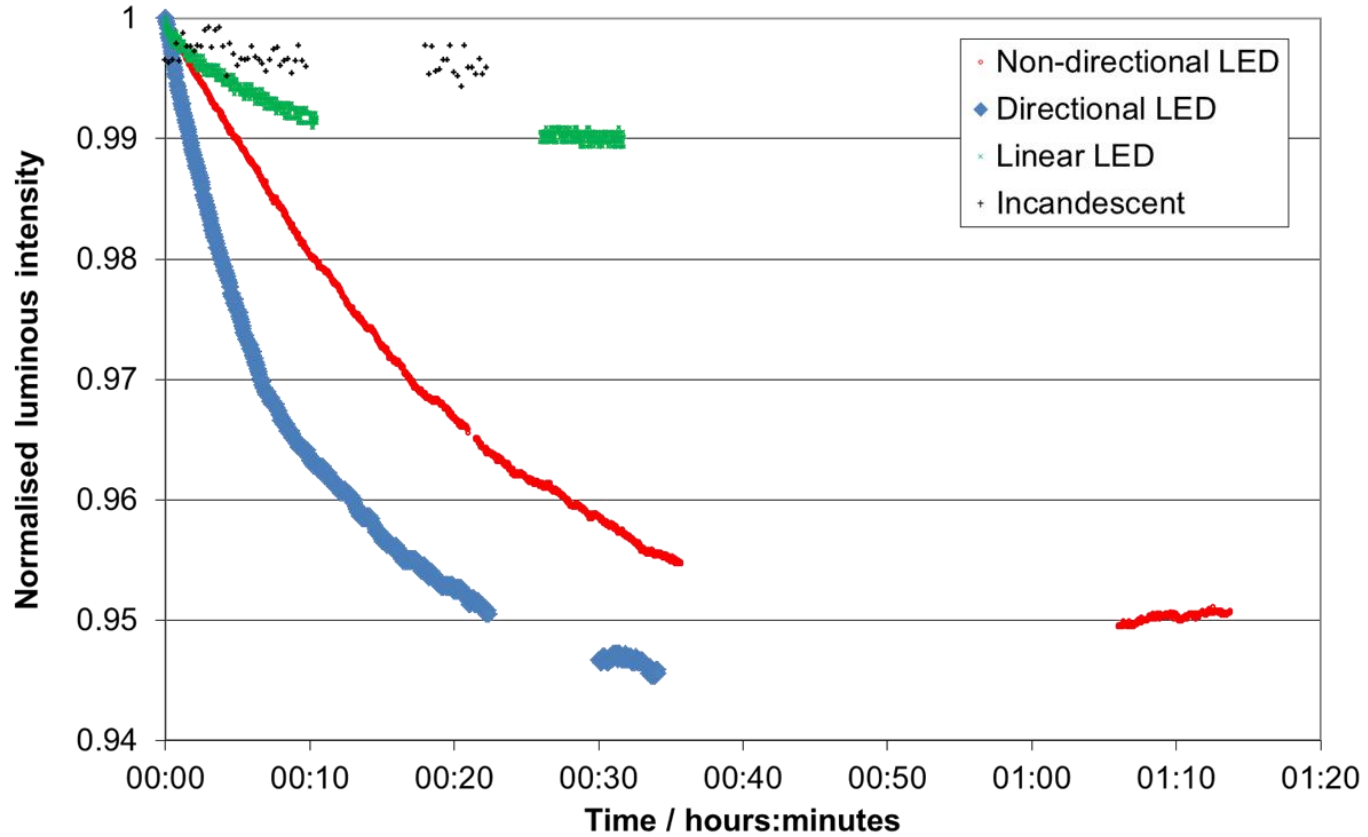
Correlated colour temperature



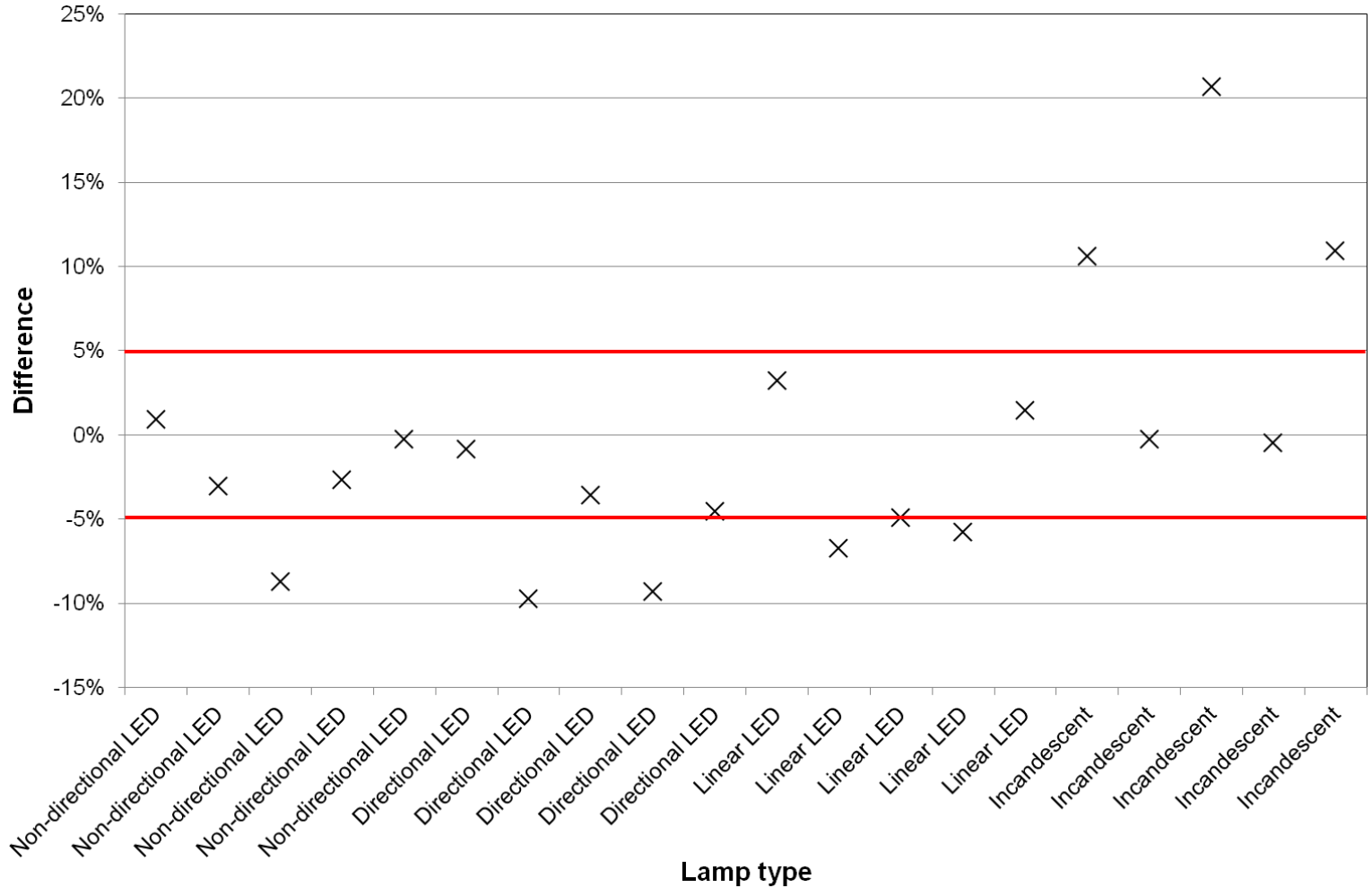
Participant measurements

- Measurements
 - luminous flux
 - power
 - luminous efficacy
 - Colour quantities - CCT

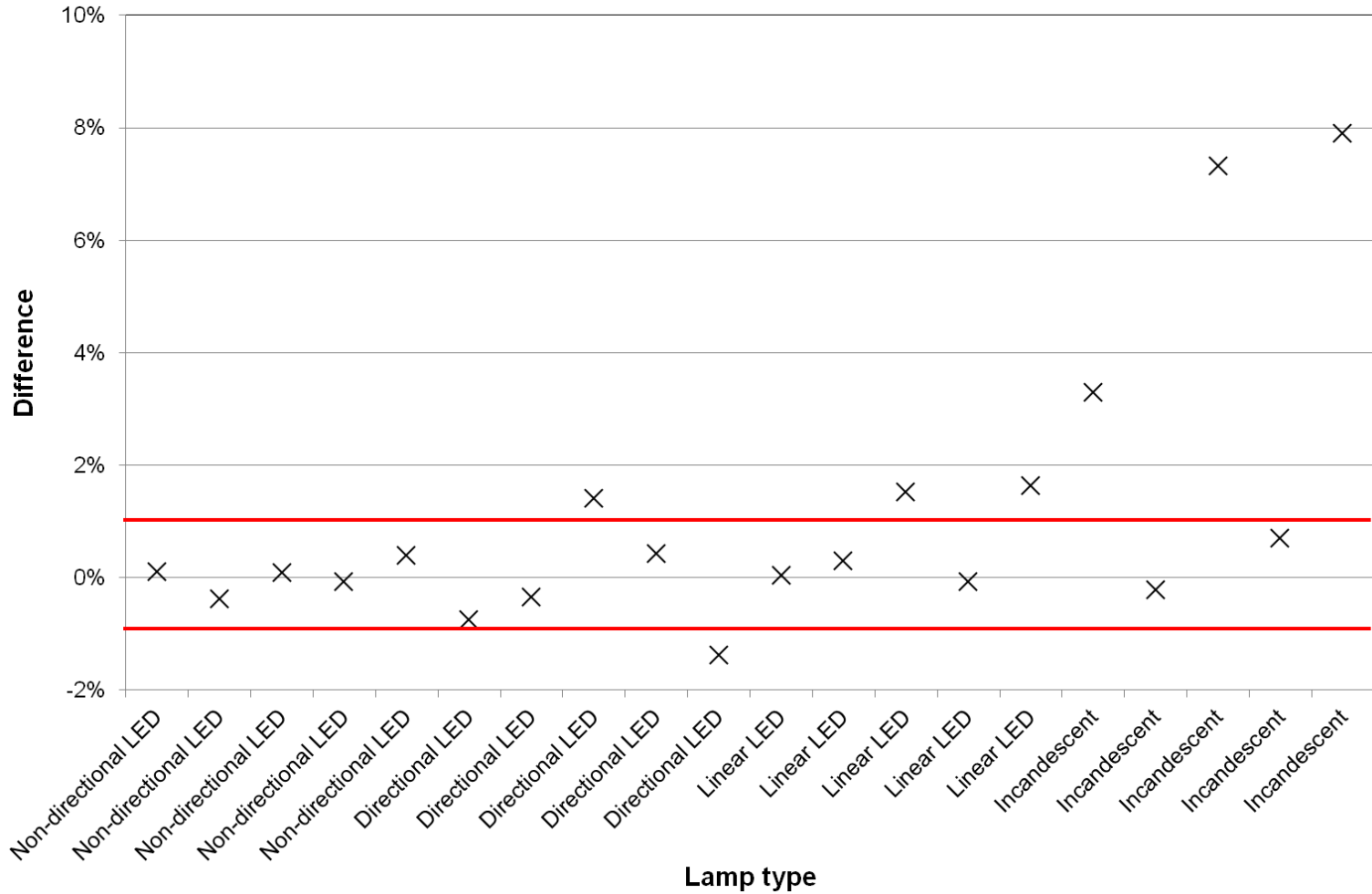
Results - Stability



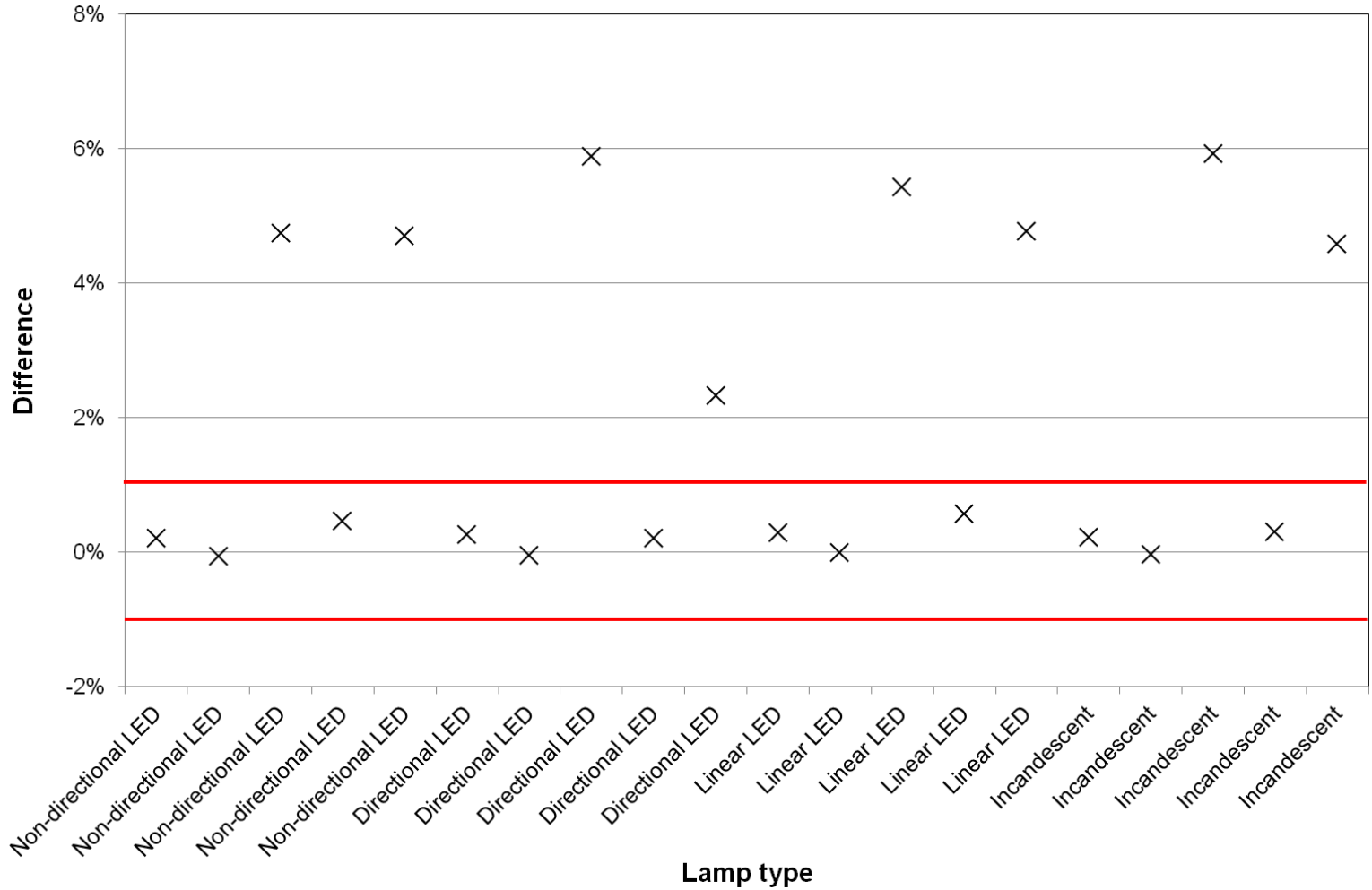
Results – Total Luminous Flux



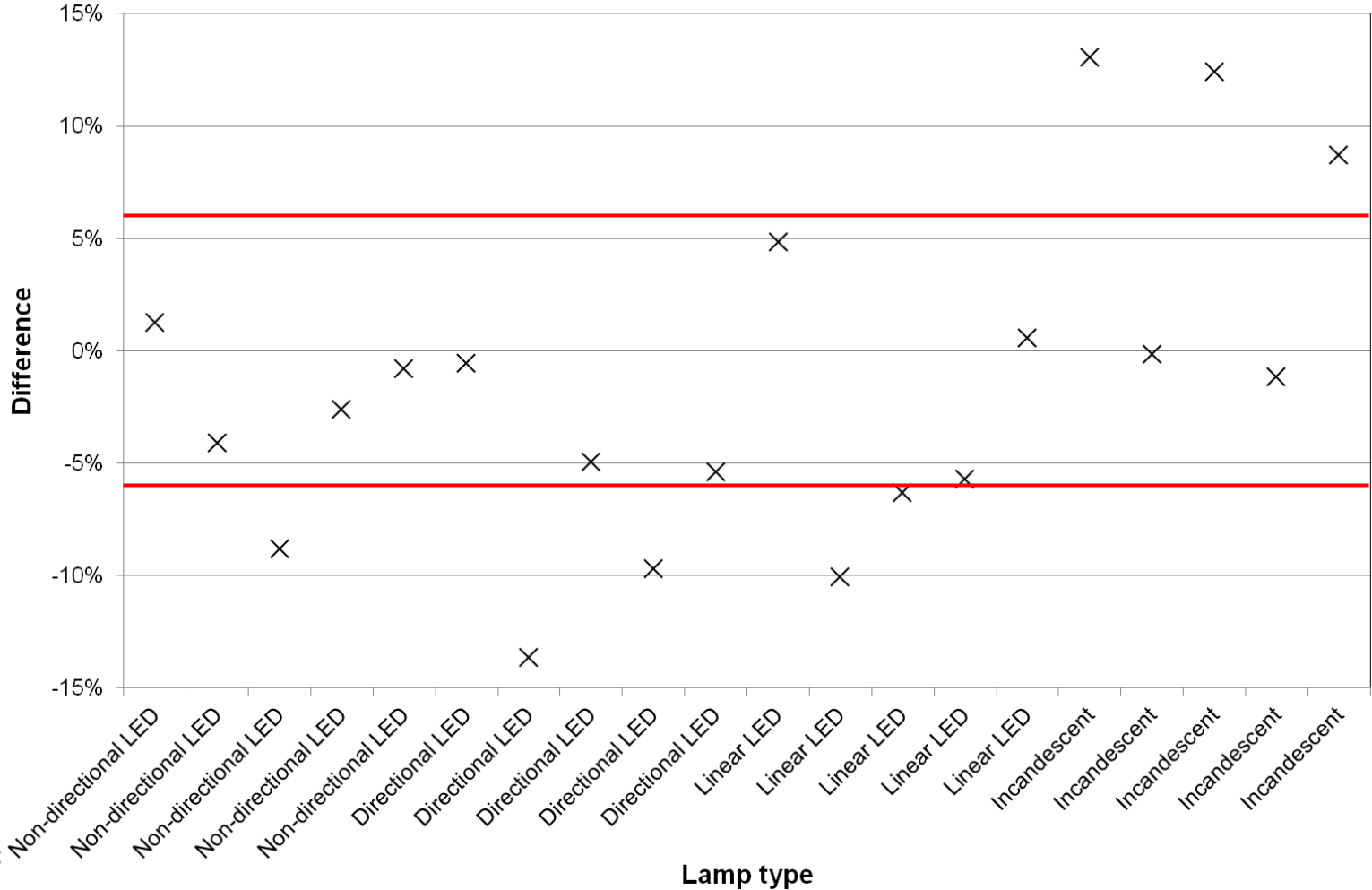
Results – Electrical power



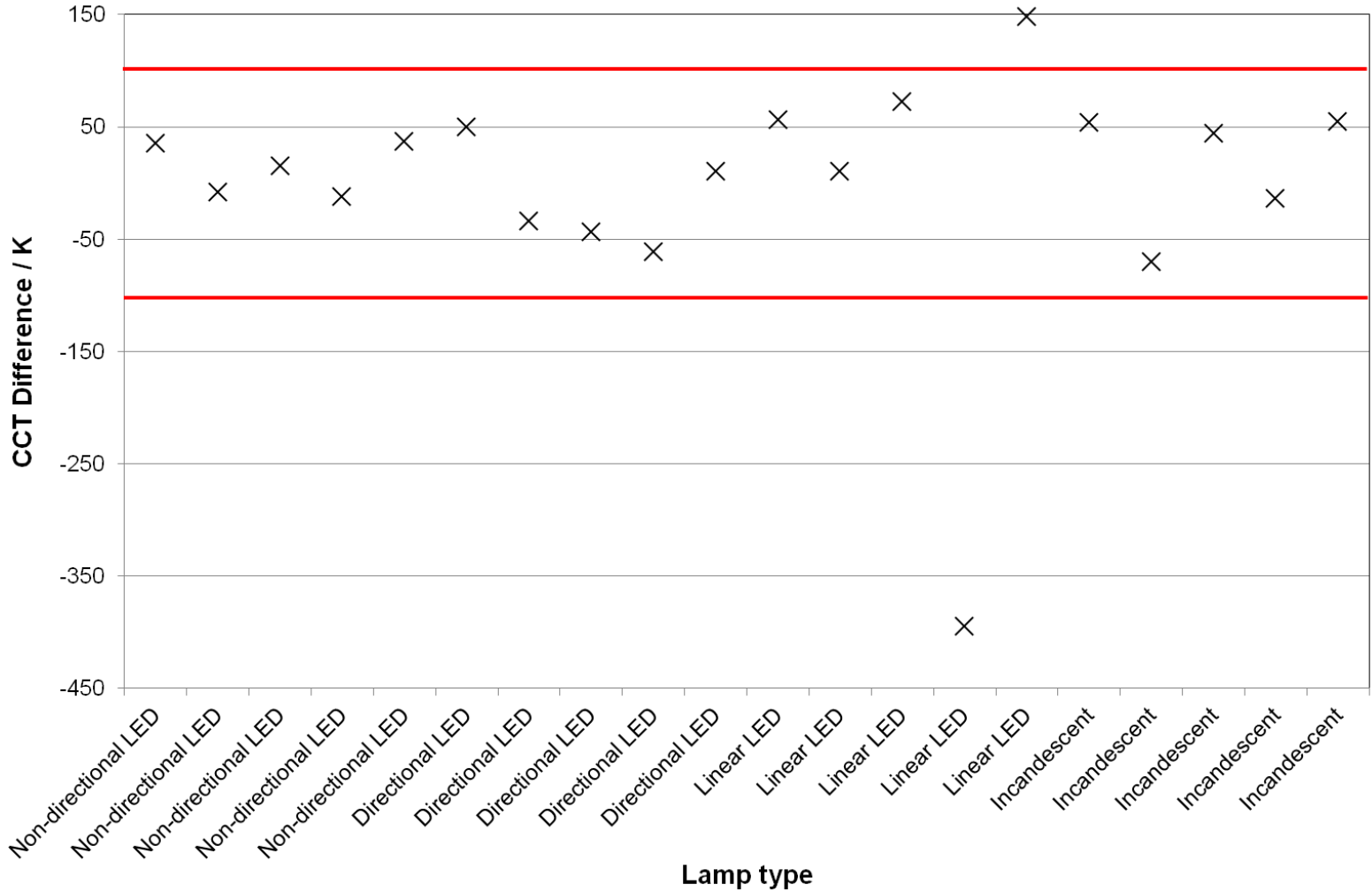
Results – Voltage



Results – Luminous efficacy



Results – CCT



Conclusions

- Challenges remaining
 - Directional SSL products
 - Power measurement
 - Stabilisation
- Quality of SSL products
- Meeting the challenges
 - EMRP Metrology for Solid State Lighting
www.m4ssl.npl.co.uk
 - CIE technical committees



Metrology
for Solid State Lighting