

ITU-T Workshop on 5G, EMF & Health
5 December 2017, Warsaw, Poland



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GSMA



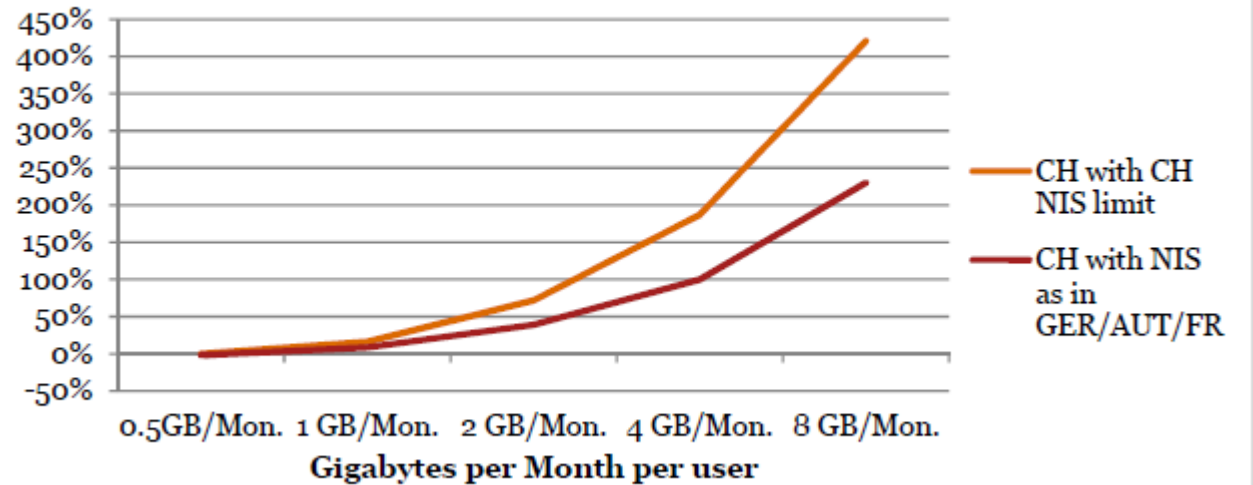
Implications of RF-EMF exposure limits for 5G: lessons from 3G and 4G deployments



Case study: Switzerland (3G)

- Limit – 5 V/m (mixed)
- Restrictive limits increase cost of deployment – more impact as data demand rises

Figure 8: Impact of NIR regulations as data demand rises



Based on deployment of HSPA 42.4

Source: PWC (2013)

- *"With the current limits [5G deployment] will be extremely difficult, if not impossible"* – Swisscom CEO (April, 2017)



Case study: Brussels (3G/4G)

- 2012 - 3 V/m (shared)
- 2013 – BIPT
 - Limit a “*serious obstacle*”
- 2013 – 3 V/m (per technology)
- 2016:
 - “*analyse all relevant elements, including whether the current limits on antenna strength could lead to quicker saturation of networks*”
- 2017 – “*5G may not be possible*”

Stralingsnorm verhindert uitrol 4G in Brussel



Kristof Van der Stadt
is hoofdredacteur bij Data News

03/07/12 om 20:30 - Bijgewerkt om 20:30
Bron: Datanews

Brussels finally gets 4G after politicians relent on tough mobile radiation cap

Summary: EC works are set to get 4G connections next year after a change in the law.



By Martin Gijzemijter for Benelux | December 12, 2013 -- 09:11 GMT (20:11 AEST)

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Belgian govt to study mobile network saturation after attack

Thursday 24 March 2016 | 11:00 CET | News

Capital of Europe loiters in mobile dead zone

Strict limits on telecoms radiation in Brussels are holding back investment in technology.

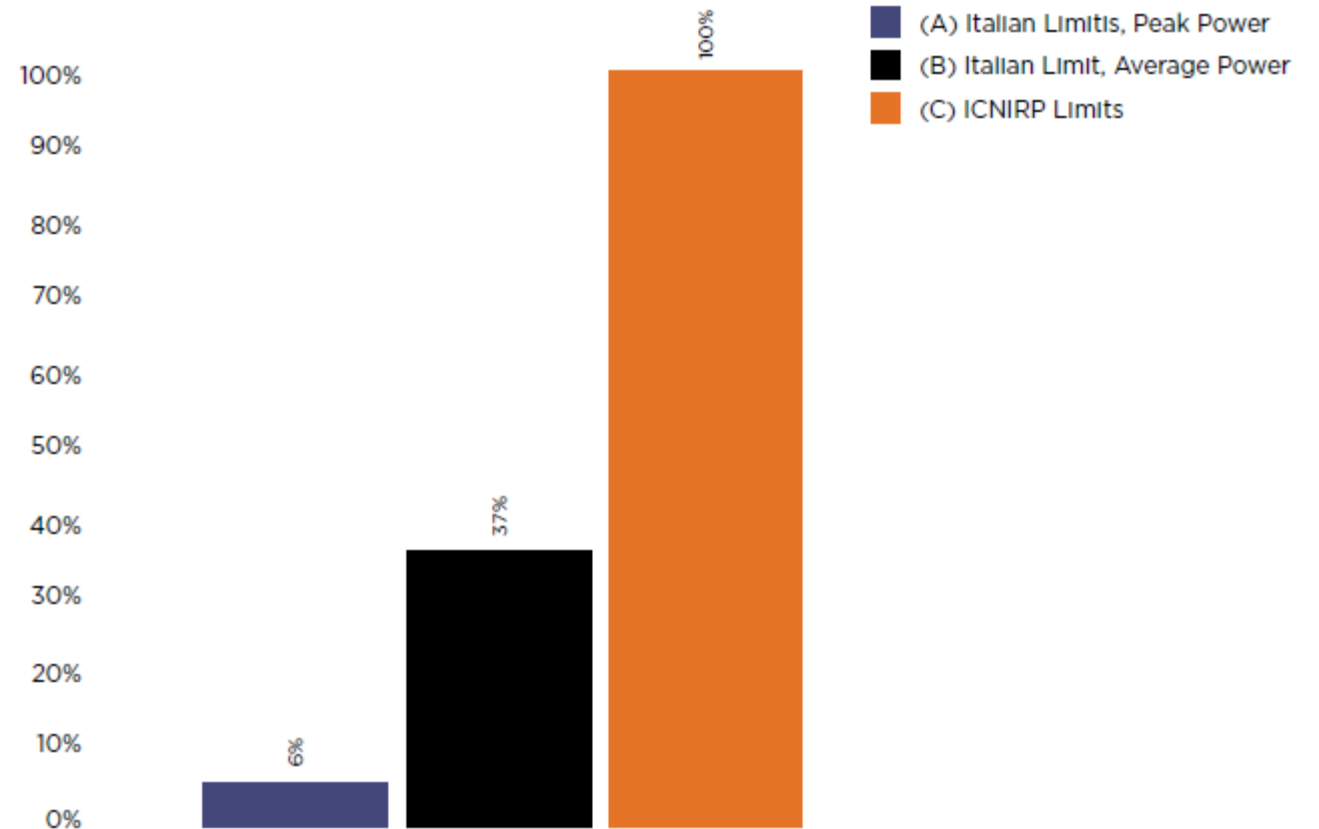
By LAURENS CERULUS | 8/29/17, 9:00 AM CET | Updated 9/13/17, 9:07 AM CET



Case study: Italy (4G)

- Limit – 6 V/m
- Average power over 24 hours provides some benefit
- With ICNIRP 100% of sites could be shared

PERCENTAGE OF NON-LTE SITES AVAILABLE FOR 4G COVERAGE AND QUALITY OF SERVICE IMPROVEMENT

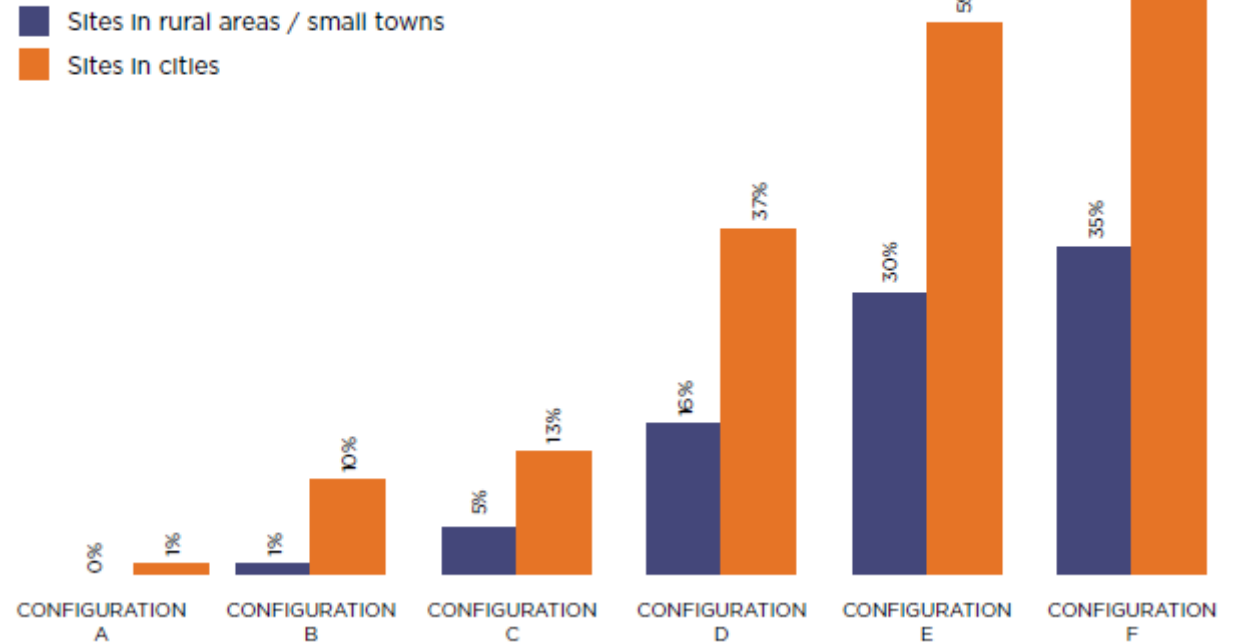




Case study: Poland (4G)

- Limit – 7 V/m
- Site sharing requires power reduction
- More sites for the same coverage

Percentage of sites with restrictions on output power



SITE CONFIGURATION ¹⁵	TECHNOLOGY
A	UMTS2100
B	GSM900 / UMTS2100
C	GSM900 / GSM1800 / UMTS2100
D	GSM900 / GSM1800 / UMTS2100 / LTE1800
E	GSM900 / GSM1800 / UMTS2100 / LTE1800 / LTE2600
F	GSM900 / GSM1800 / UMTS2100 / LTE1800 / LTE2600 / LTE800



RF-EMF levels in public areas are highly variable

Environment International 68 (2014) 49–54



Contents lists available at ScienceDirect

Environment International

journal homepage: www.elsevier.com/locate/envint



Radio-frequency electromagnetic field (RF-EMF) exposure levels in different European outdoor urban environments in comparison with regulatory limits



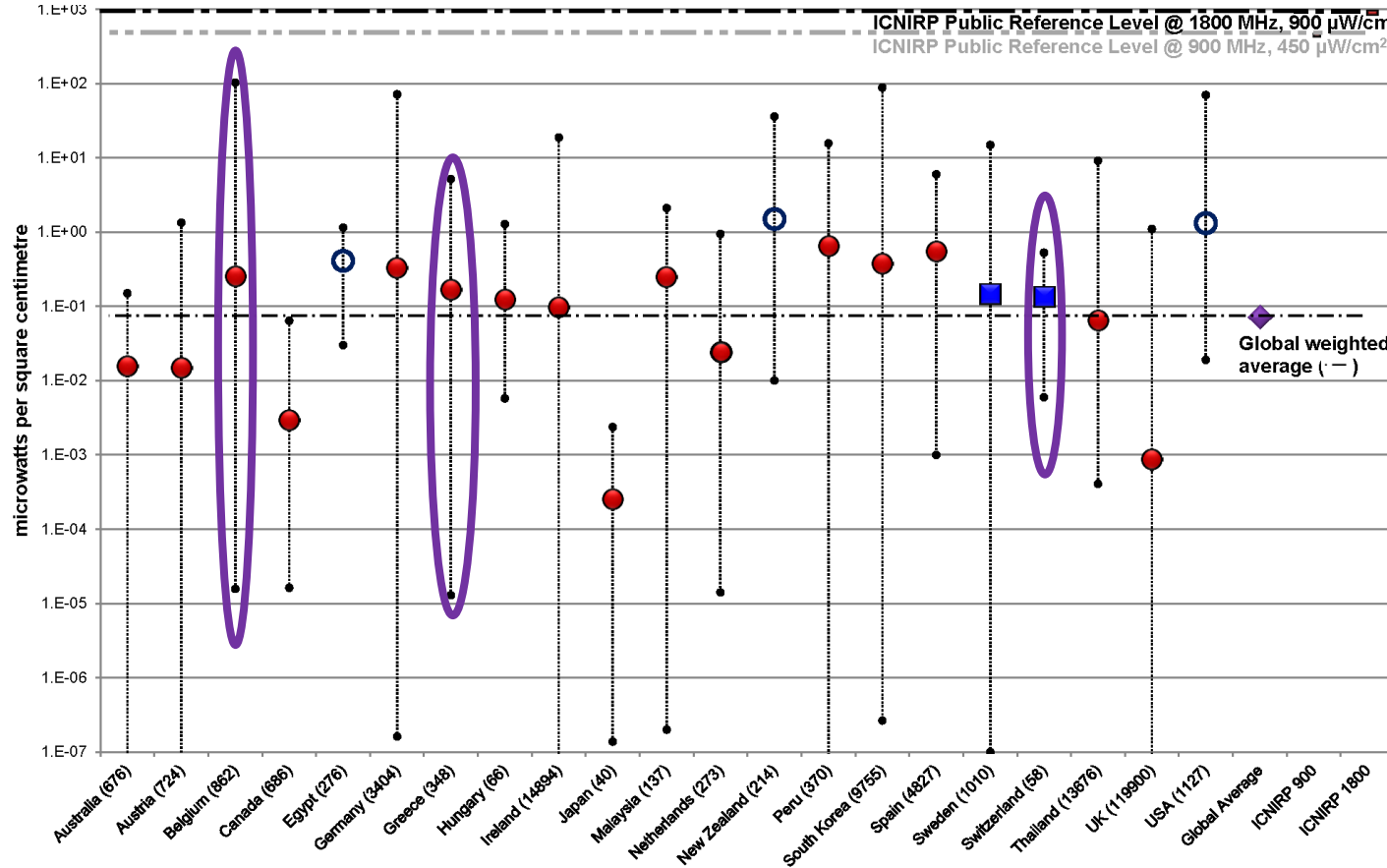
Damiano Urbinello ^{a,b,c}, Wout Joseph ^c, Anke Huss ^d, Leen Verloock ^c, Johan Beekhuizen ^d, Roel Vermeulen ^d, Luc Martens ^c, Martin Röösli ^{a,b,*}

- Measurements in Belgium, Switzerland, the Netherlands.
 - *“Exposure levels were highly spatially variable and varied considerably between different areas within as well as between cities.”*



Restrictive limits do not result in lower public exposure

Figure 1. Minimum (●), maximum (●) and narrowband average (●), broadband average (○) or mixed narrowband/broadband average (■) of all survey data for each country with the number of measurement points for the country in brackets. For comparison, the global weighted average marked with dot-dashed line through (◇) and the ICNIRP reference levels for the public at 900 and 1800MHz are also plotted.



Country with restrictive RF-EMF limit



Conclusions

- Restrictive RF-EMF limits do not appear to result in lower public exposures
- Restrictive RF-EMF limits make site sharing difficult, thereby increasing the number of antenna sites and increasing the cost of deployment
- Restrictive EMF limits delay deployment of new mobile technologies and associated societal benefits



Thanks for listening

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<http://www.gsma.com/publicpolicy/consumer-affairs/emf-and-health>



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