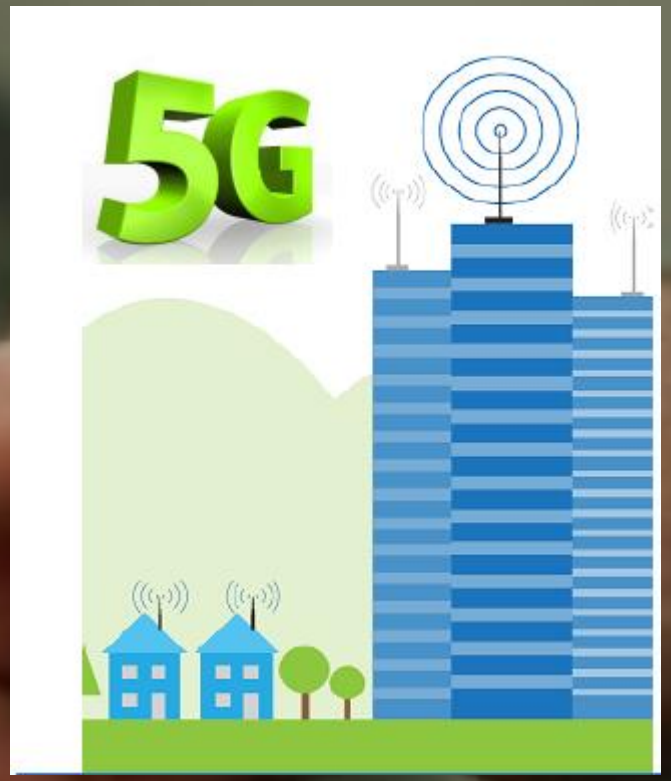
ITU-T Workshop on 5G, EMF & Health
5 December 2017, Warsaw, Poland

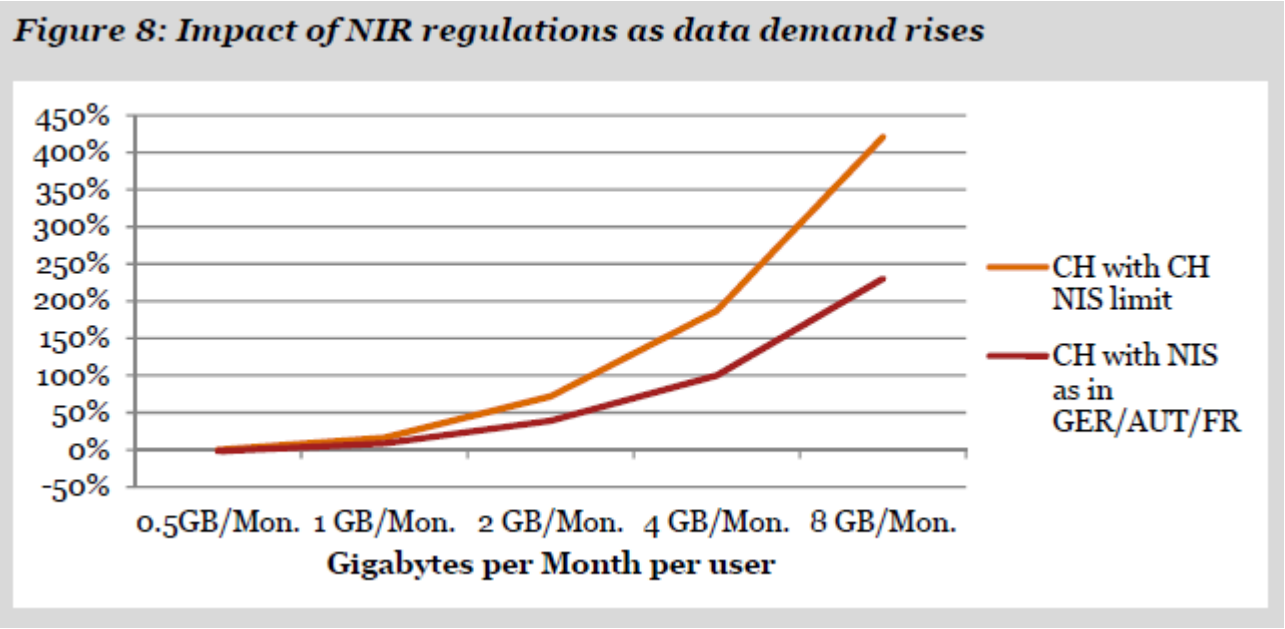


Dr Jack Rowley
Senior Director Research & Sustainability
GSMA

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



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 wonks 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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INTERNET

Belgian govt to study mobile network saturation after attack

Thursday 24 March 2016 | 11:00 CET | News

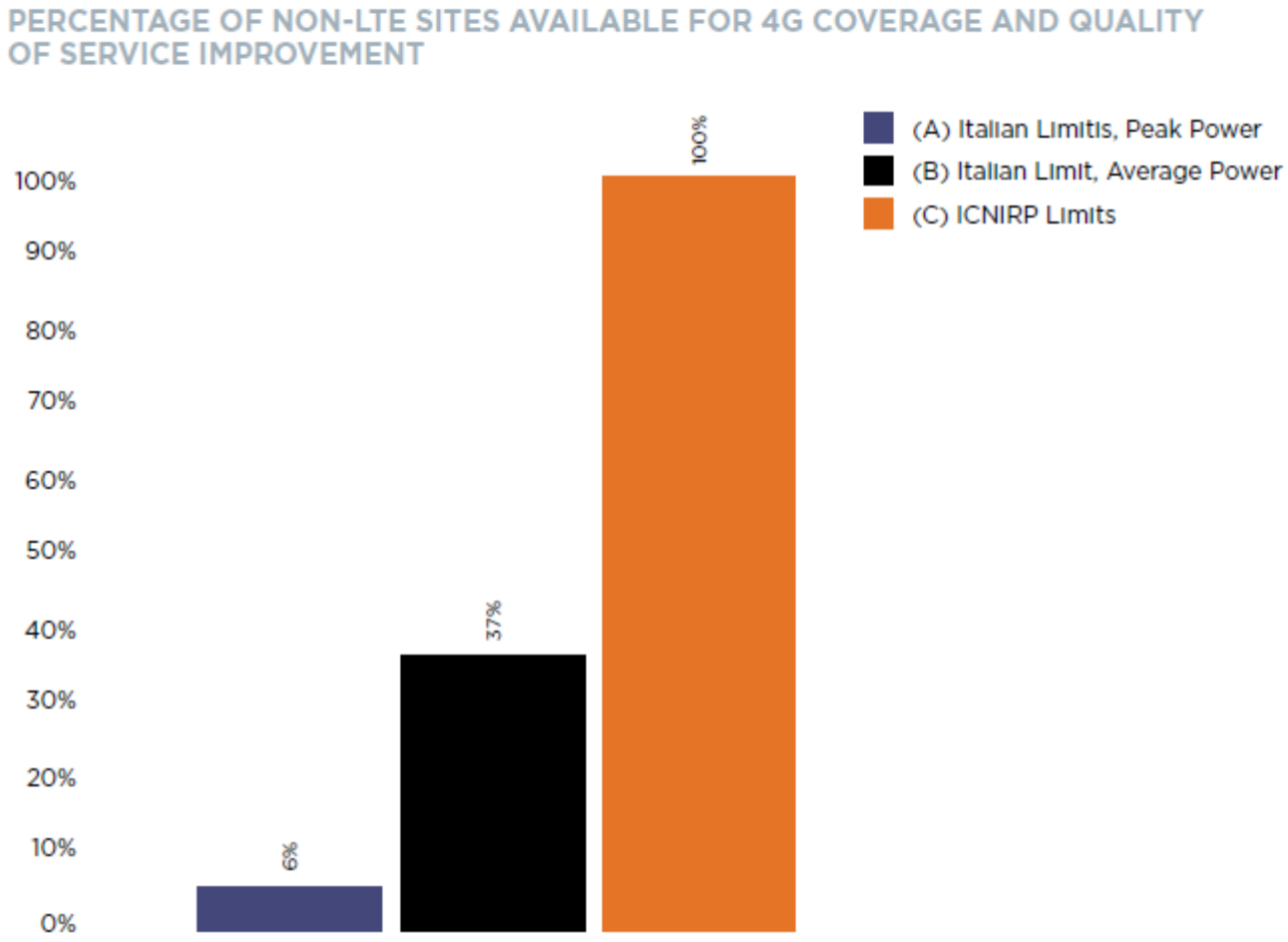
Capital of Europe loiters in mobile dead zone

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)

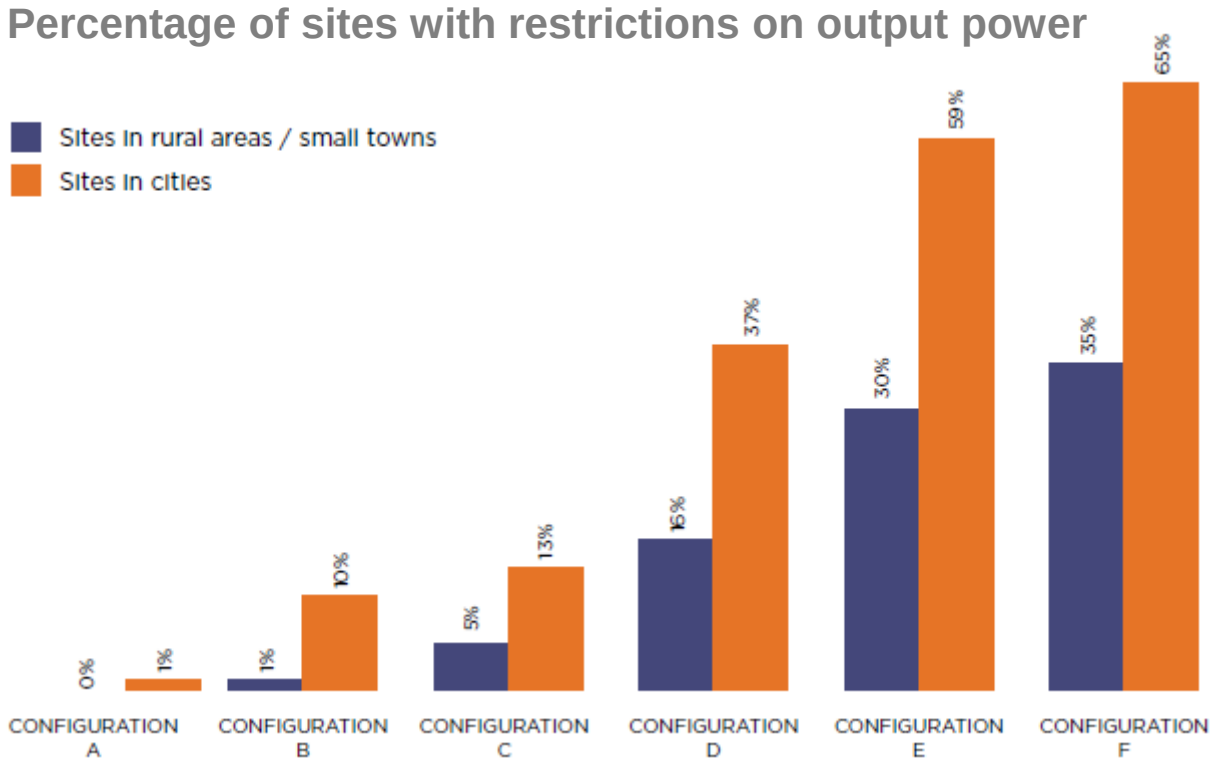
- Limit – 6 V/m
- Average power over 24 hours provides some benefit
- With ICNIRP 100% of sites could be shared



Source: GSMA (2014)

Case study: Poland (4G)

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



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

Source: GSMA (2014)

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

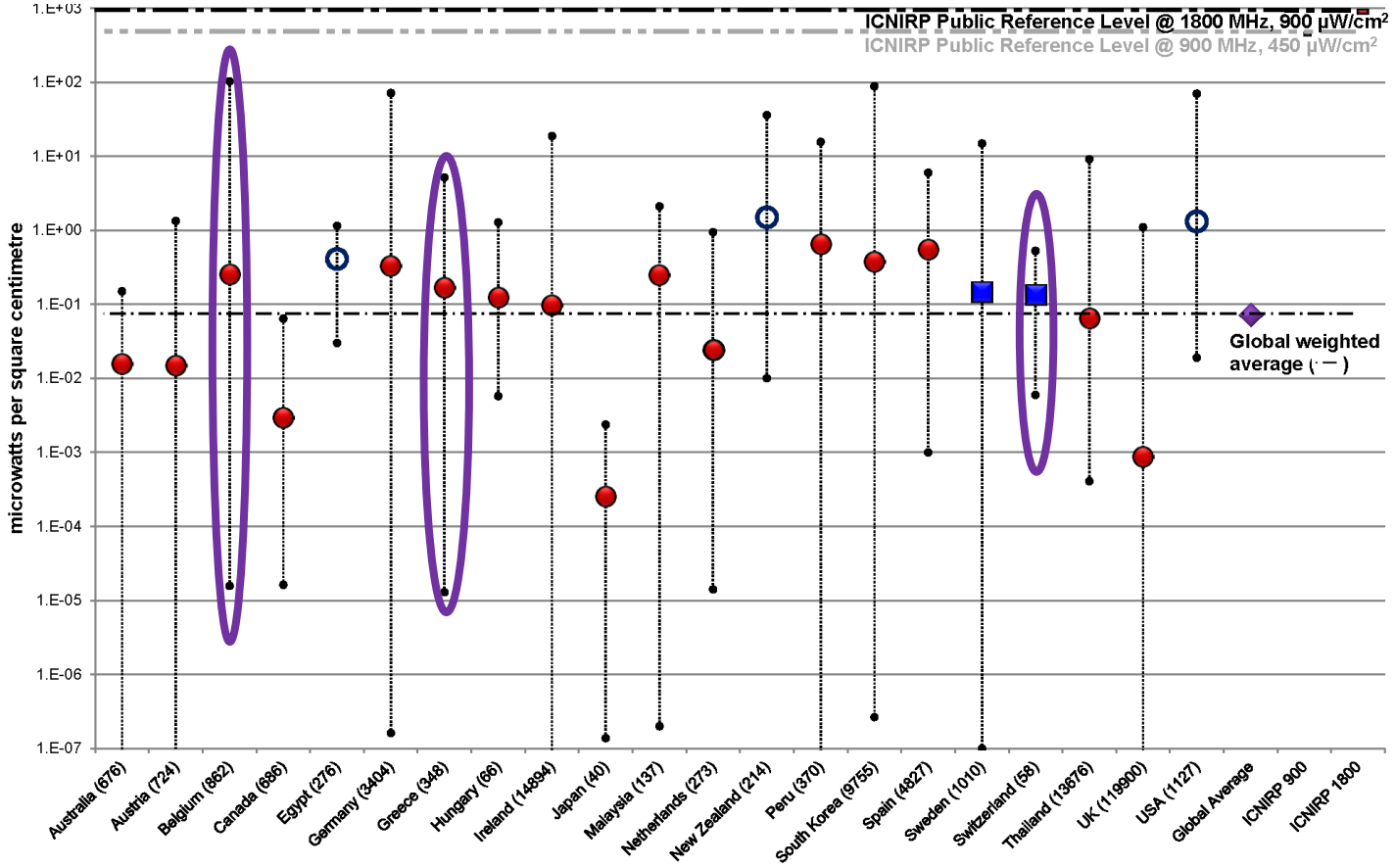
Radio–frequency electromagnetic field (RF–EMF) exposure levels in different European outdoor urban environments in comparison with regulatory limits

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 1800 MHz are also plotted.

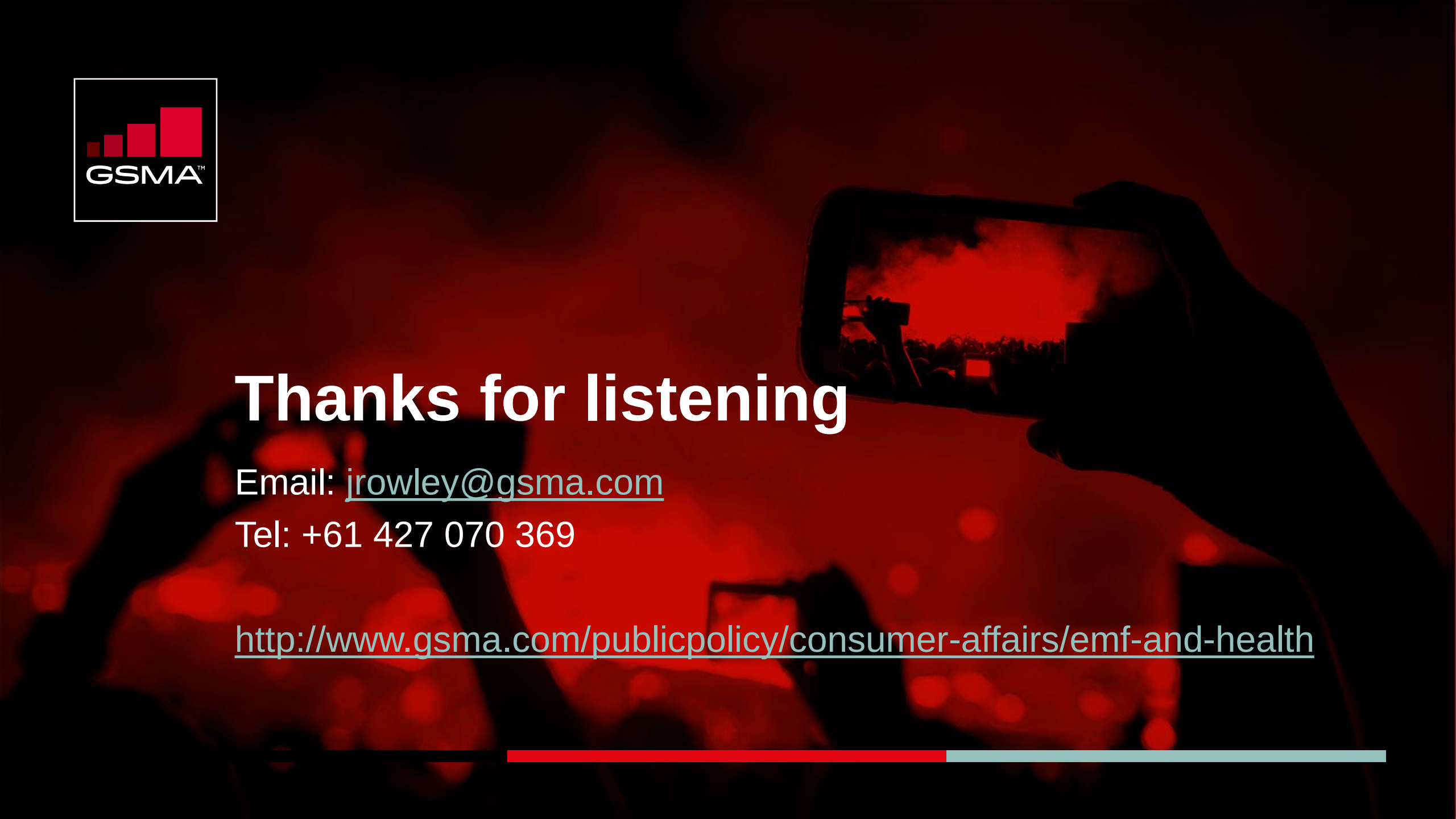


Country with restrictive RF-EMF limit

Source: Rowley & Joyner, 2012

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

About the GSMA