



Open Discussion #2

NICE
MAY 2025

Theme

**Digital Technologies and their Impact
on Human Health**

NexComm 2025 & DigitalWorld 2025



Open Discussion #2

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Ignitor

Prof. Dr. Petre Dini, IARIA, USA/EU



Drivers

Prof. MD. Svetlana Herasevich, Mayo Clinic -
Rochester, USA



Prof. Dr. Gerhard Hube, Technical University of
Applied Sciences Würzburg-Schweinfurt,
Germany





Themes

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Body: Vision, Position, Muscles, Bones,

Brain (cognition): Sensory interpretation, adaptive real-immersive hysteresis, induced hallucinations, etc.

(physical): Electromagnetic waves (nanoA - 10^{-9} A -, ..., NanoV, ..., nSeconds)

Habit: Squared instead of natural, digital guidelines vs human guidelines, addictive, etc.

Digital stress: Mental disorders. digital addiction, digital dependency, etc.

Vulnerable classes: Young pupils, children, older adults, etc.



Absorbing the digital

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- **Gradual negotiation with the technologies around us - Tom Chatfield**
- **Environmental Remanence (Real vs Virtual)**
 - Brain and games
 - Immersion environments
 - VR-based recovery
 - VR-training
- **Co-evolving with Technologies**
 - Uninformed (Ignorance) and Informed (hesitation)
 - Human minds are literally extended into aspects of the environment surrounding them
 - Metaverse is training the AI-based tools with virtual models
- **The power of Digital**
 - Practicing, learning, trusting
 - Mental upgrade and digital acceptance (through Digital Literacy)



Fighting the un-known

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■ Immersive Literacy

- Environmental Remanence (Real vs Virtual)
- Co-evolving with Technologies
- The power of Augmented Reality and Immersion (from acceptance to use)

■ Personalized Cognitive Assistance

- Cognitive Rehabilitation
- Elderly Cognitive Support
- Learning Disabilities

■ Challenges

- Adaptive algorithms (Interactive Content, Feedback mechanisms)
- Accessibility (Individuals in low-resource settings or with severe disabilities)
- Privacy and Ethics (Safeguarding the sensitive data collected from users)

■ (Hidden) Side effects

- Spatial deskilling (*individuals lose their ability to perform spatial tasks*)
- Real-Virtual Cognitive Mismatch (*reduced transfer of skills and knowledge from virtual to real settings*)
- Immersion Dependency

Developmental
Dyslexia and Nerve
Noise

Low frequency
stimuli [4.5, 40]

Parietal occipital
regions:

Dyslexia:: deficit in
syllables processing
which is associated
with the Theta
band (4-7 Hz)

Brain Models: brain
models that
captures large-
scale brain activity



Back-up slides

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Videoconferencing Fatigue

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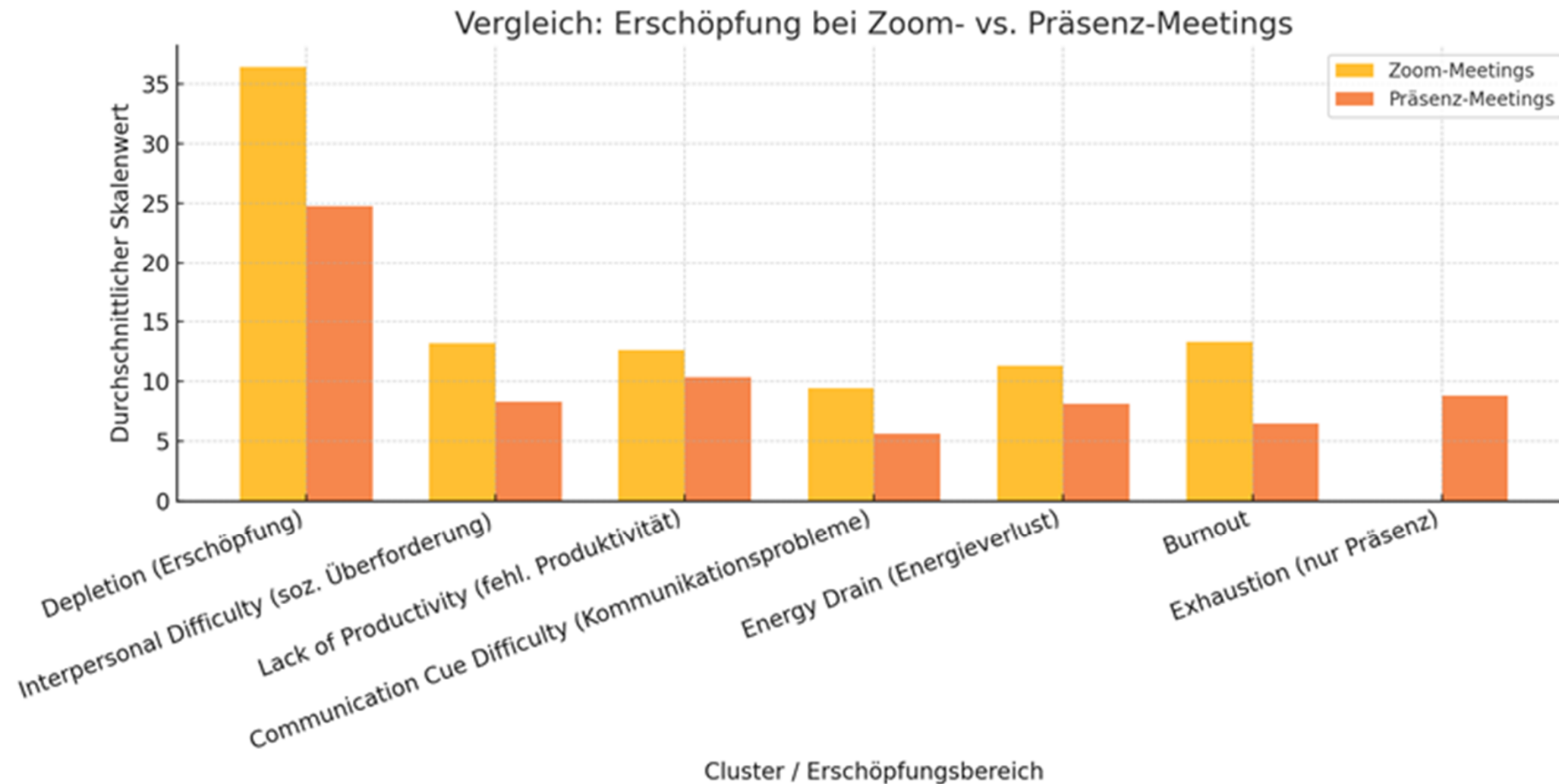
- **Videoconferencing fatigue is truly different from fatigue after in-person meetings (Based on survey data from 472 U.S. college students (Knox et al., 2023). With Zoom, for example, there are more:**
 - Cognitive fatigue (because you have to concentrate more)
 - Emotional exhaustion (e.g., from constantly seeing yourself)
 - Difficulty with social interactions (due to a lack of body language)
 - In-person meetings showed similar but less intense fatigue, with an additional 'Exhaustion' factor.





Videoconferencing Fatigue

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Lauren E. Knox, Sara R. Berzenski & Stefanie A. Drew (2023) Measuring Zoom Fatigue in College Students: Development and Validation of the Meeting Fatigue Scale for Videoconferencing (MFS-V) and the Meeting Fatigue Scale for In-Person (MFS-I), Media Psychology, 26:6, 680-712, DOI: 10.1080/15213269.2023.2204529



Videoconferencing Fatigue

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■ How to decrease Fatigue?

Intervention

Disable Self-View

Use Focus View

Opt for Natural Backgrounds

Encourage Active Participation

Shorter, Frequent Meetings

Reduce On-Screen Stimuli

Effect on Fatigue

Reduces cognitive load and fatigue

Minimizes distractions from multiple faces

Decreases visual processing demands

Increases engagement, reduces fatigue

Prevents cognitive overload

Maintains focus, reduces mental fatigue





Body impact

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- **Body Health impact**
- Impact on Vision
- Impact on Mental status
- Impact on the Backbone
- Impact on Hands, Wrists, and Fingers
- Impacts on Rest, Leisure, and Well-Being

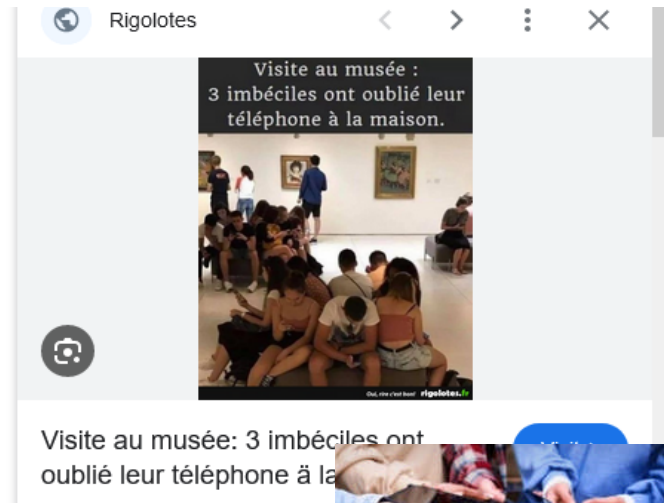


Body & Habit

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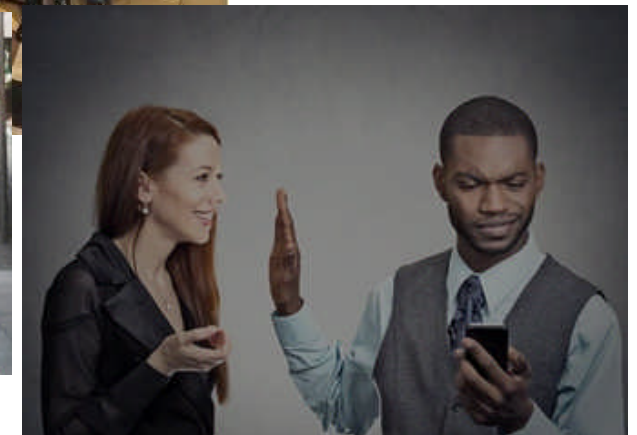
Addiction and health side-effects

Text neck



Smartphone finger

Each hand is made of 27 bones, 35 muscles, and over 100 tendons connecting bones and muscles. Your flexor tendons bend your fingers, and tendons that straighten your fingers are called extensor tendons.



Adversities

- Becoming Mentally Lazy
- Light emitted from your mobile device's screen might just be messing up your sleep cycle
- It might affect vision (in progress studies)



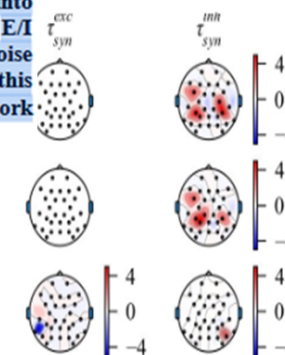
Cognitive dependency

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- **Dependency on Immersive Environments**
- **Several ways** (sensory disorientation, social interactions, cognitive overhead)
- **From Immersive to Real Environments** (sensory readaptation, isolation, decisions)
- **From Real to Immersive Environments** (overstimulation, confusion, escapism)

Developmental Dyslexia
and Nerve Noise
Low frequency stimuli
[4.5, 40]
Parietal occipital
regions:
Dyslexia:: deficit in
syllables processing
which is associated with
the Theta band (4-7 Hz)
Brain Models: brain
models that captures
large-scale brain activity
From Immersive to Real
Environments

Abstract— Effective language processing relies on the brain's capacity to decode rhythmic cues in speech, a function primarily supported by activity in the theta frequency band. According to the Temporal Sampling Framework, impairments in this process may contribute to the phonological deficits observed in individuals with Developmental Dyslexia (DD). These challenges cascade into higher-frequency bands, affecting the integration of phonemes, words, and phrases, ultimately compromising reading and writing fluency. Early diagnosis and treatment are crucial for ensuring proper personal and academic development in children. In this study, we propose a non-invasive methodology that combines ElectroEncephaloGraphy (EEG) data with a surrogate modelling framework to detect early imbalances in Excitation/Inhibition (E/I) mechanisms. We applied this methodology to a cohort of children, divided into controls and DD groups, and compared the inferred E/I mechanisms with patterns predicted by the neural noise hypothesis. We found that the results obtained using this framework align with both the Temporal Sampling Framework and the Neural Noise Hypothesis.



Increase in E/I in parietal and frontal regions -> Neural Noise Hypothesis in Dyslexia

Increment of τ_{synI} in frontal and parietal-central for 4.8 Hz. Significant differences decreases as stimuli increases.

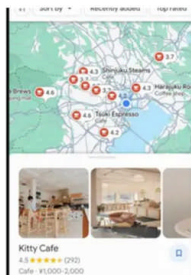
Delayed responses of inhibitory currents due to increment of τ_{synI} also aligns with Neural Noise Hypothesis in Dyslexia.



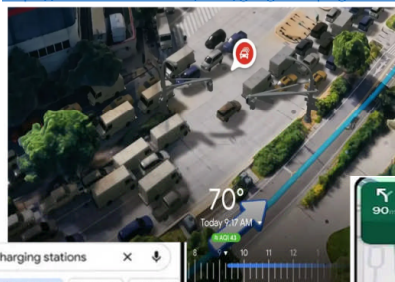
Panelist Position



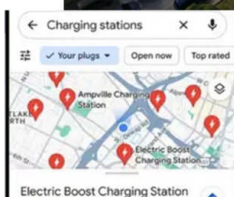
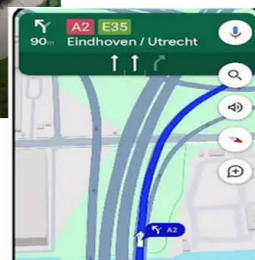
Google Maps getting major upgrade thanks to new trend taking world by storm



Google Maps gets a massive AI upgrade with 5 new features
The latest updates to Google Maps makes it smarter and more helpful
<https://www.foxnews.com/tech/google-maps-gets-massive-ai-upgrade-5-new-features>



3D with Imm





SAR case

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Specific Absorption Rate

SAR measures the rate at which the body absorbs radiofrequency (RF) energy from a device like a mobile phone.

It's expressed in watts per kilogram (W/kg).

It specifically evaluates potential thermal effects on human tissue, especially in the head and body during phone usage.

EU Limits:

Head and Body: 2.0 W/kg averaged over 10 grams of tissue.

Limbs: 4.0 W/kg averaged over 10 grams of tissue.

Context in France:

France has been particularly strict on SAR compliance.

The maximum SAR limit in the EU is:

2.0 W/kg averaged over 10 grams of tissue for the head and body

4.0 W/kg for limbs

Some phones were found to exceed this limit in real-use conditions (like when kept in pockets), leading to recalls, fines, or sales suspensions.

In 2020s, France also recommended keeping phones away from the body when possible and avoiding use by children for long periods.

Apple iPhone 12

Issue: In September 2023, the ANFR found that the iPhone 12 exceeded the European Union's SAR limit for limbs, measuring 5.74 W/kg, surpassing the 4.0 W/kg threshold.

Action Taken: France demanded Apple withdraw the iPhone 12 from the market. [Apple responded by releasing a software update to address the issue.](#)

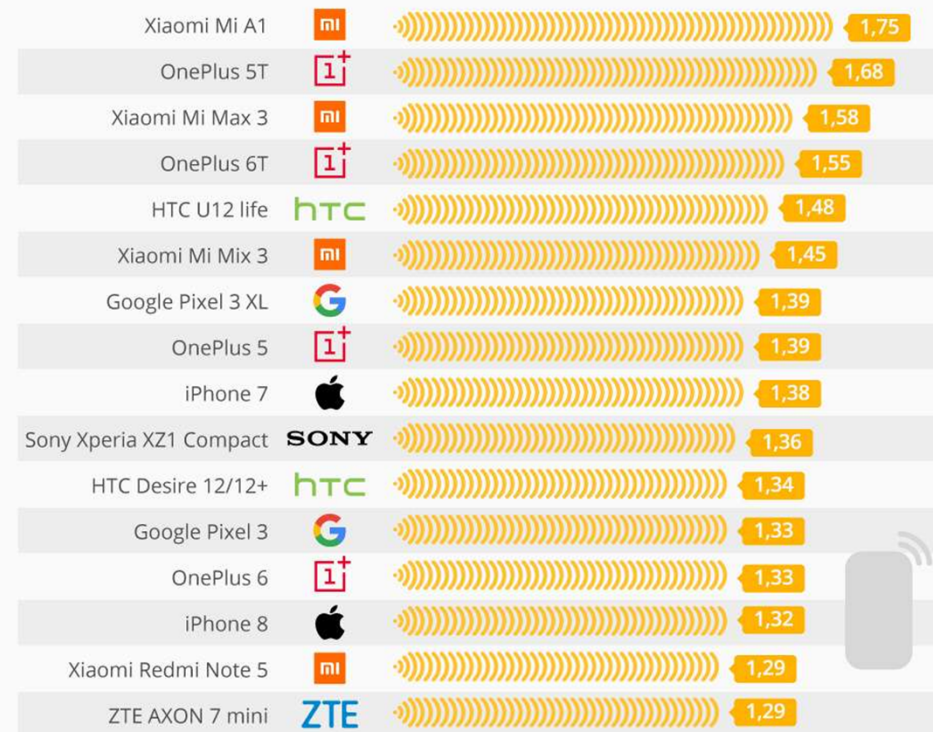


SAR case

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Les smartphones émettant le plus de radiations

"Débit d'Absorption Spécifique" des smartphones suivants* en watt par kg**



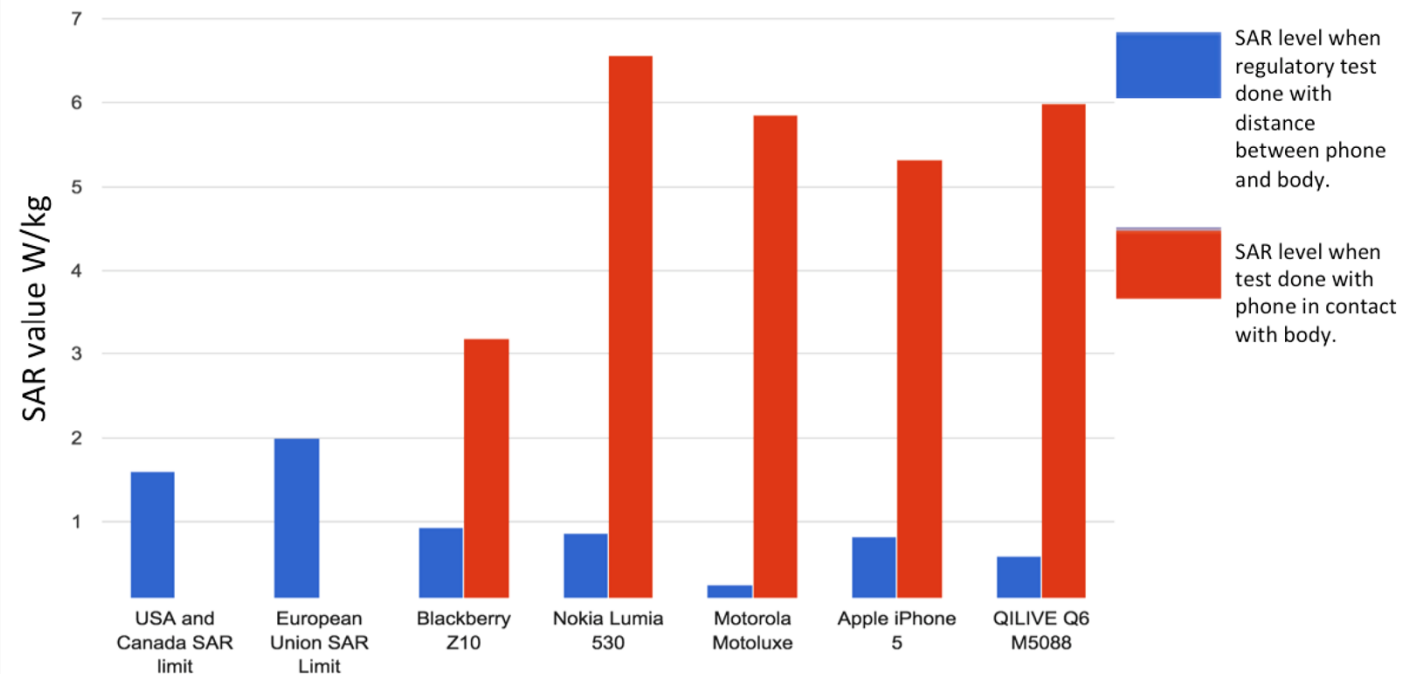
* Modèles actuels en date du 10 décembre 2018 et provenant des fabricants suivants : Apple, Blackberry, Google, HTC, Huawei, LG, Motorola, OnePlus, Samsung, Sony, Xiaomi, ZTE.

** Lors d'un appel avec le téléphone accolé à l'oreille.

Source : Office fédéral allemand de la radioprotection (Bundesamt für Strahlenschutz)

statista

Cell Phone Radiation SAR Levels Released by the French National Frequency Agency June 1, 2017



Regulatory Limits

Cell Phone Models Comparing Regulatory Compliance Tests With Tests In Direct Contact With Body

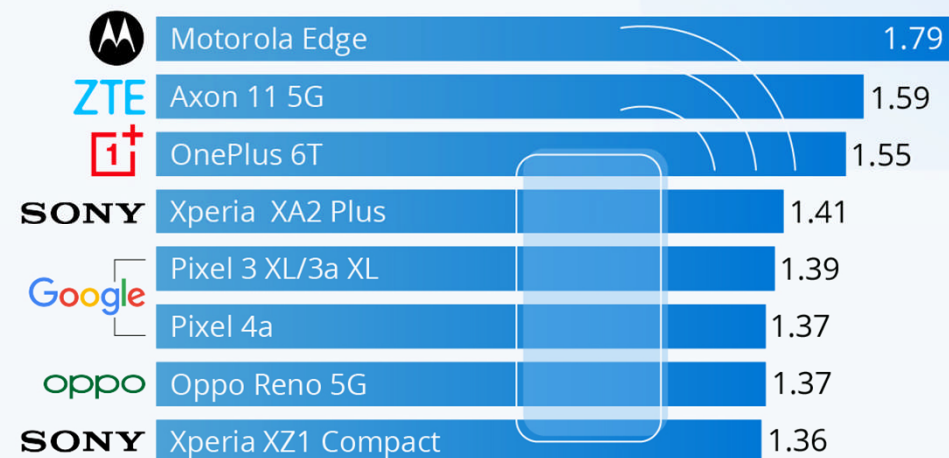


SAR case

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The Phones Emitting the Most Radiation

'Specific Absorption Rate' of smartphones that emit the most radiation* (in watts per kilogram**)



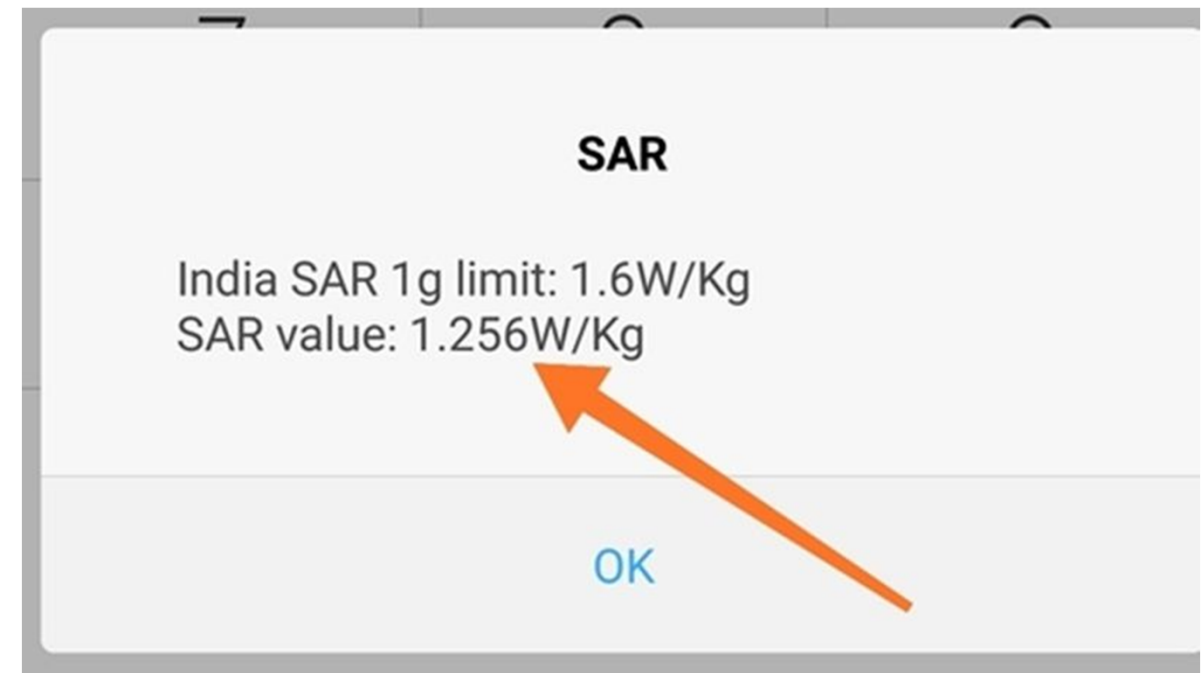
* Current smartphone models (as of Dec 9, 2021) from the following vendors: Apple, Google, Huawei, LG, Motorola, OnePlus, Oppo, Samsung, Sony, Xiaomi, ZTE.

** While calling with phone placed on ear.

Source: German Federal Office for Radiation Protection



statista





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**THE STAGE IS
YOURS**