

Electromagnetic Fields

and what you need to know



- Electromagnetic spectrum
- History of EMFs
- EMF stressors
- Dirty Electricity
- Radio Frequency, Smart Meters & 5G
- Magnetic Fields
- Electric Fields
- Light Pollution
- Electrosensitivity
- Action and prevention



THE ELECTROMAGNETIC SPECTRUM

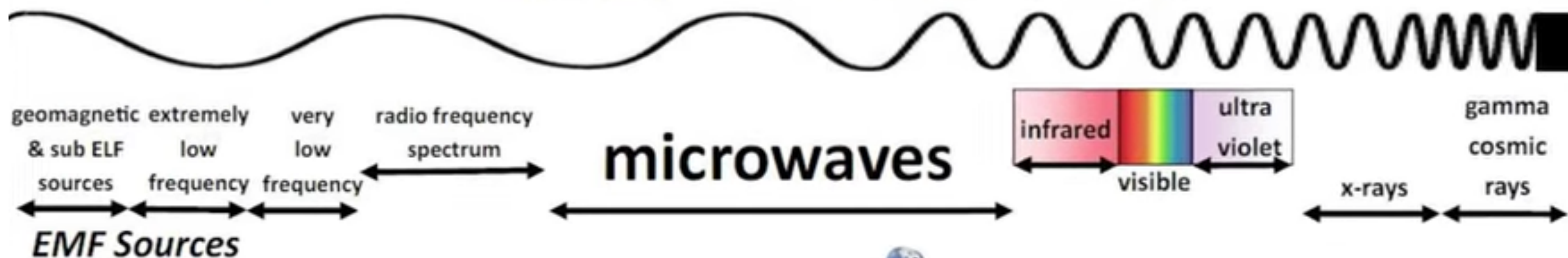
SELF ELF VLF LF/ MF/ HF/ VHF/ UHF SHF EHF
DC 3Hz 3KHz 30KHz 3GHz 5GHz 300GHz 430-750THz 30PHz 3EHZ 300EHZ

non-ionizing

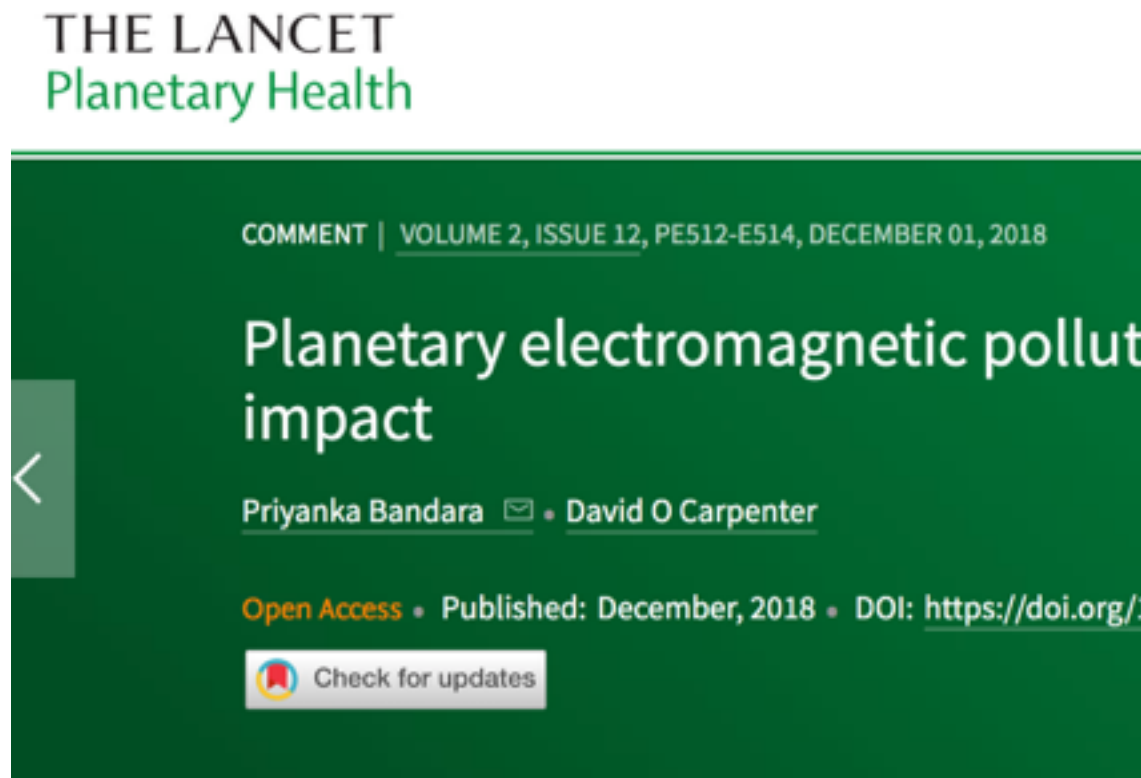
ionizing

wavelength

$$f \text{ (frequency)} = \frac{C \text{ (speed of light)}}{\lambda \text{ (wavelength)}}$$

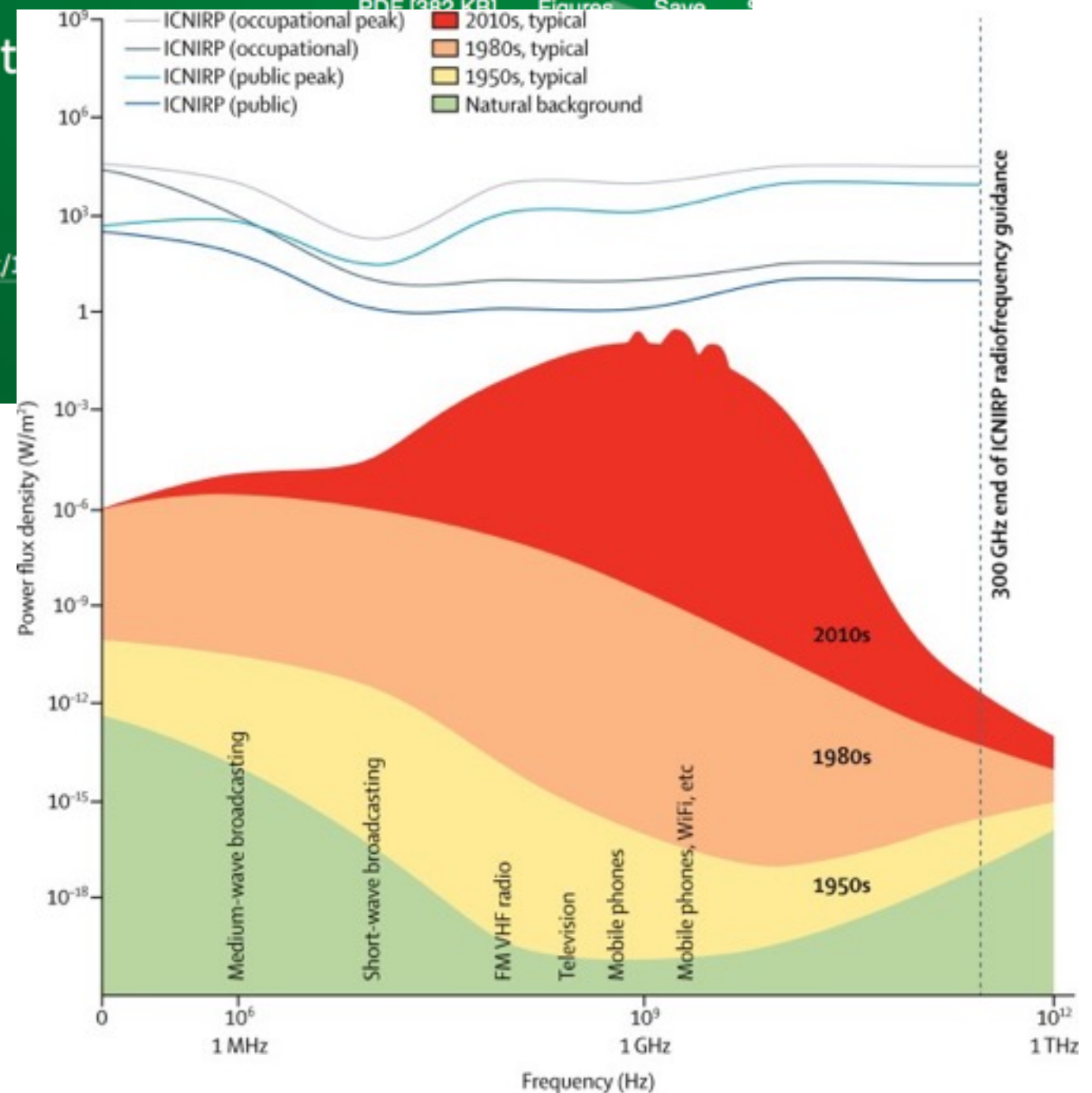


Our Electromog World



Manmade microwave radiation is a digital pulsed square wave.

Natural microwave radiation is a pure analog sine wave.



Ancestral Times

Zero manmade EMF

Connected to the natural EMF of the Earth

Slept within the Earth's magnetic field

Awoke with the sun, slept soon after sunset

Experienced the full solar spectrum

Ate locally and with the seasons

Modern Day

Live, work and travel in layers of manmade EMFs

Live, work and travel in EMFs

Disconnected from the earth by rubber soled shoes

Sleep above ground surrounded in EMFs

Live inside in artificial light

Cover our bodies and eyes when outside

Eat food from all over the world from different light cycles

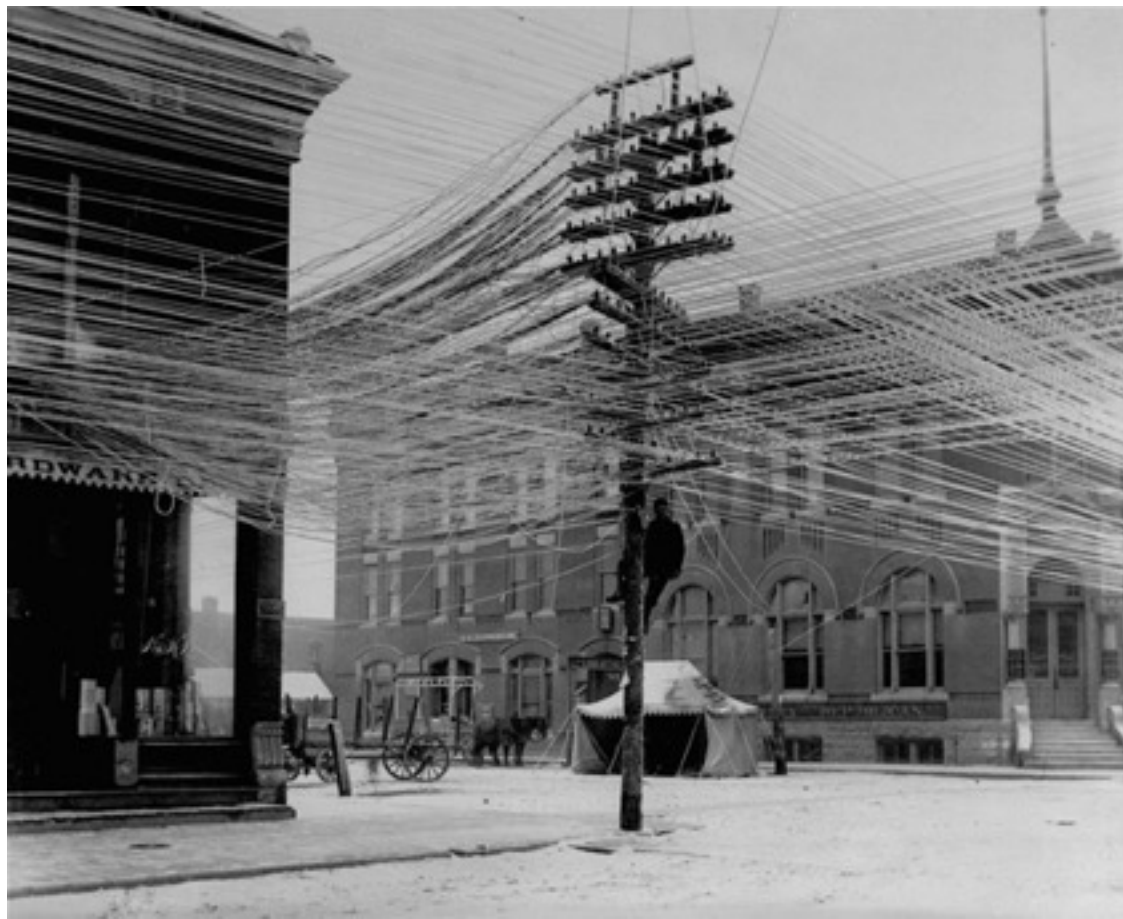
History of EMFs

1840's - Telegraphs

1860's - Invention of the light bulb

1890's - Rollout of the electric grid

1915 - Radio waves used in WWI



Epidemiologist Dr. Samuel Milham traced the rollout of the electric grid with increased diseases rates in the US.

Mid 1800's onwards neurasthenia was a disease attributed to modern civilisation.

1970's and 1980's

Television
Electric cooker
Stereo with speakers
Overhead light
Standing lamp
Tape recorder
Incandescent bulbs

Gas Fire
Gas boiler

Low EMF footprint



Modern EMFs

Cell phone towers

Cell phones

Wireless networks - WiFi

Cordless phones

Home appliances esp induction hobs

Heat pumps/panel heaters/bar heaters

WiFi (multiple)

TV and Radio

Microwave ovens

Lights/lamps/wall fittings

Computers/Laptops/Tablets

Smart electricity meters

LED alarm clocks

House alarms

Stereos/speakers

Power tools

Charging devices

Cars/Trains/Buses/Planes/Motorbikes

Work places/Shopping Centres/Cafes etc

CFL/LED Bulbs

Baby monitors

Wireless switches

Bluetooth devices

Earphones

Wireless watches

Computer Monitors

Wearable tech



High EMF footprint

EMF stressors in the home

Dirty Electricity

Modern electronic equipment, solar power, heat pumps, motors, wiring issues etc. add electrical distortions..

Radio Frequency

Cell phones and transmitters, WiFi, Bluetooth, cordless phones, baby monitors, alarms etc

Magnetic fields

House wiring under load creates AC magnetic fields, heaters, wiring errors, electric blankets, underfloor heating, microwave ovens, fridges etc

Electric fields

House wiring active circuits, appliances, switches etc

Light Pollution

Artificial light spectrum, light noise, Fluorescent, CFL and LED bulbs, 12v transformers

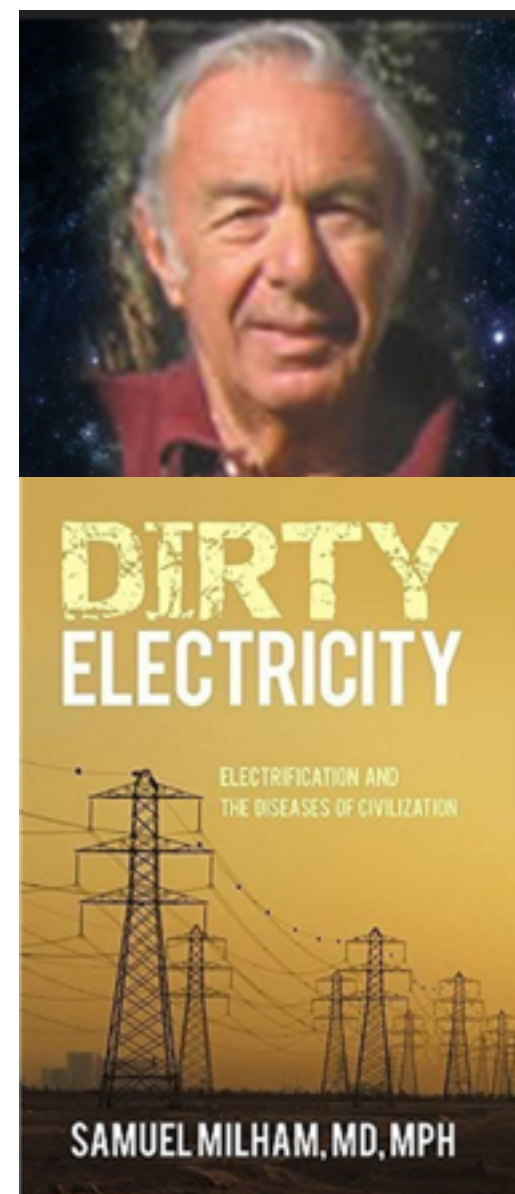
Also known as:

**Dirty Power
Power Quality
Voltage Transients
Harmonic Distortion
Current spikes
RF/EMI Interference**

Dirty Electricity

Epidemiologist

Dr. Samuel Milham



Electricity enters your home already dirty

- Connected appliances
- Smart meters
- Fluorescent lights, CFL and LED bulbs
- TV on standby, SMPS for computers/laptops
- Vacuum cleaners, hair dryers, washing machine
- Wiring errors, dimmers, kitchen appliances
- Cell phone towers..

Building Biology refers to DE as
Microsurge Electrical Pollution or MEP = any surge over the 50Hz frequency

Dirty Electricity

Not just confined to wires...

Radio Frequency jump conduct onto electric circuits

Metal surfaces in a house conduct the electro magnetic pollution in the air (Field DE)

Main issue:

The human body is a semi conductor attracting EMFs that induce currents in the body.

**“Inductive Interference caused
by parasitic coupling”**

High dirty electricity in action..



Devonport medical centre with 9 transmitters on the roof
Electric circuits in this building will have very high DE..

Question

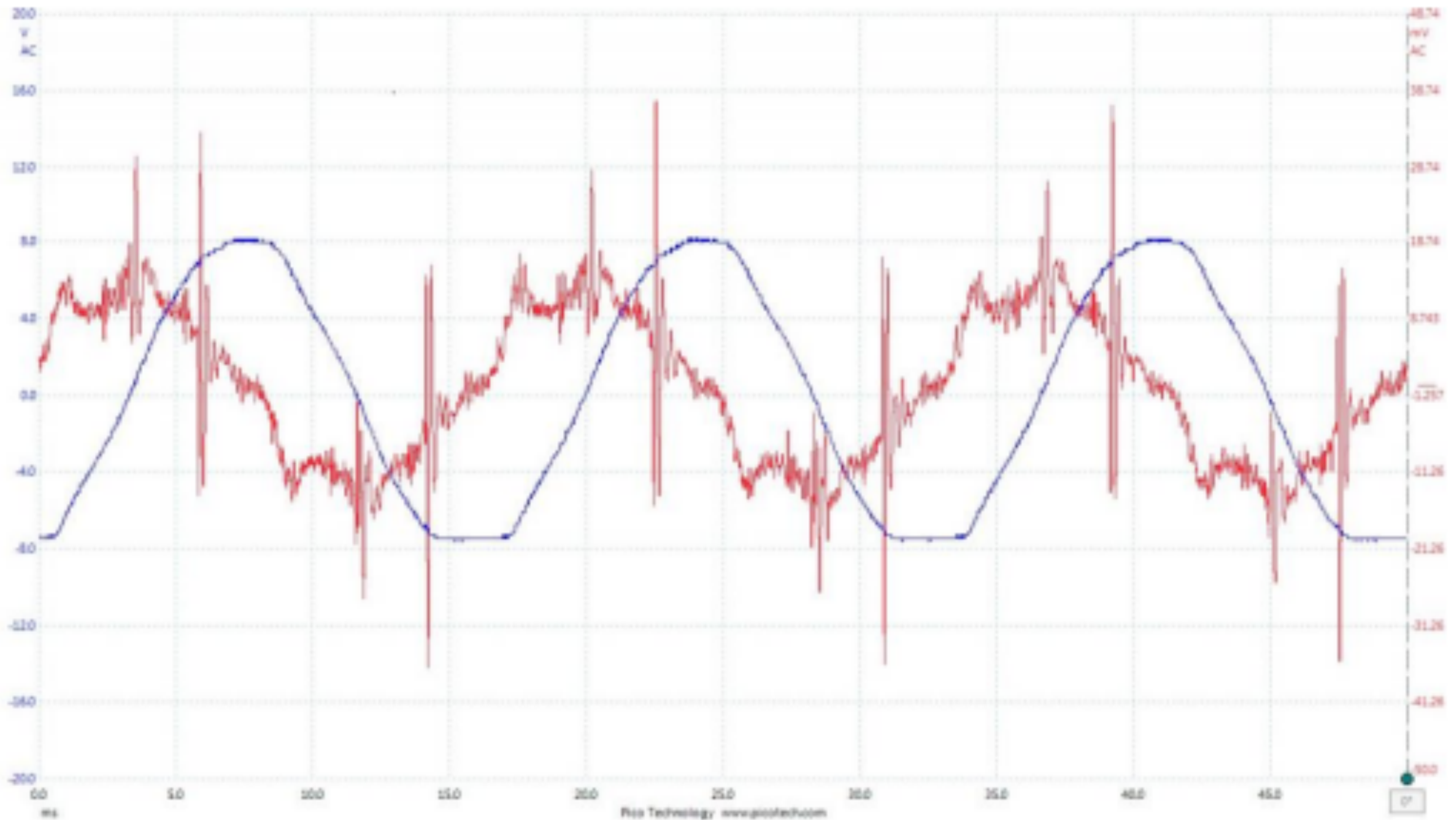
What are the top 3 biggest contributors to dirty electricity in a modern home?

Solar power
Heatpumps / Airconditioning
Outside sources

What percentage of homes have high dirty electricity?

Approx 95%

What does Dirty Electricity look like?



Biologically active frequencies - 50KHz to 150KHz

Electromagnetic Hypersensitivity: Biological Effects of Dirty Electricity with Emphasis on Diabetes and Multiple Sclerosis

MAGDA HAVAS

Environmental and Resource Studies, Trent University, Peterborough,
Ontario, Canada

Dirty electricity is a ubiquitous pollutant. It flows along wires and radiates from them and involves both extremely low frequency electromagnetic fields and radio frequency radiation. Until recently, dirty electricity has been largely ignored by the scientific community. Recent inventions of metering and filter equipment provide scientists with the tools to measure and reduce dirty electricity on electrical wires. Several case studies and anecdotal reports are presented. Graham/Stetzer (GS) filters have been installed in schools with sick building syndrome and both staff

Artificial Radio Frequencies

Often also called microwave radiation 3GHz +
Contains high frequency electric and magnetic fields
Modulated signal characteristics

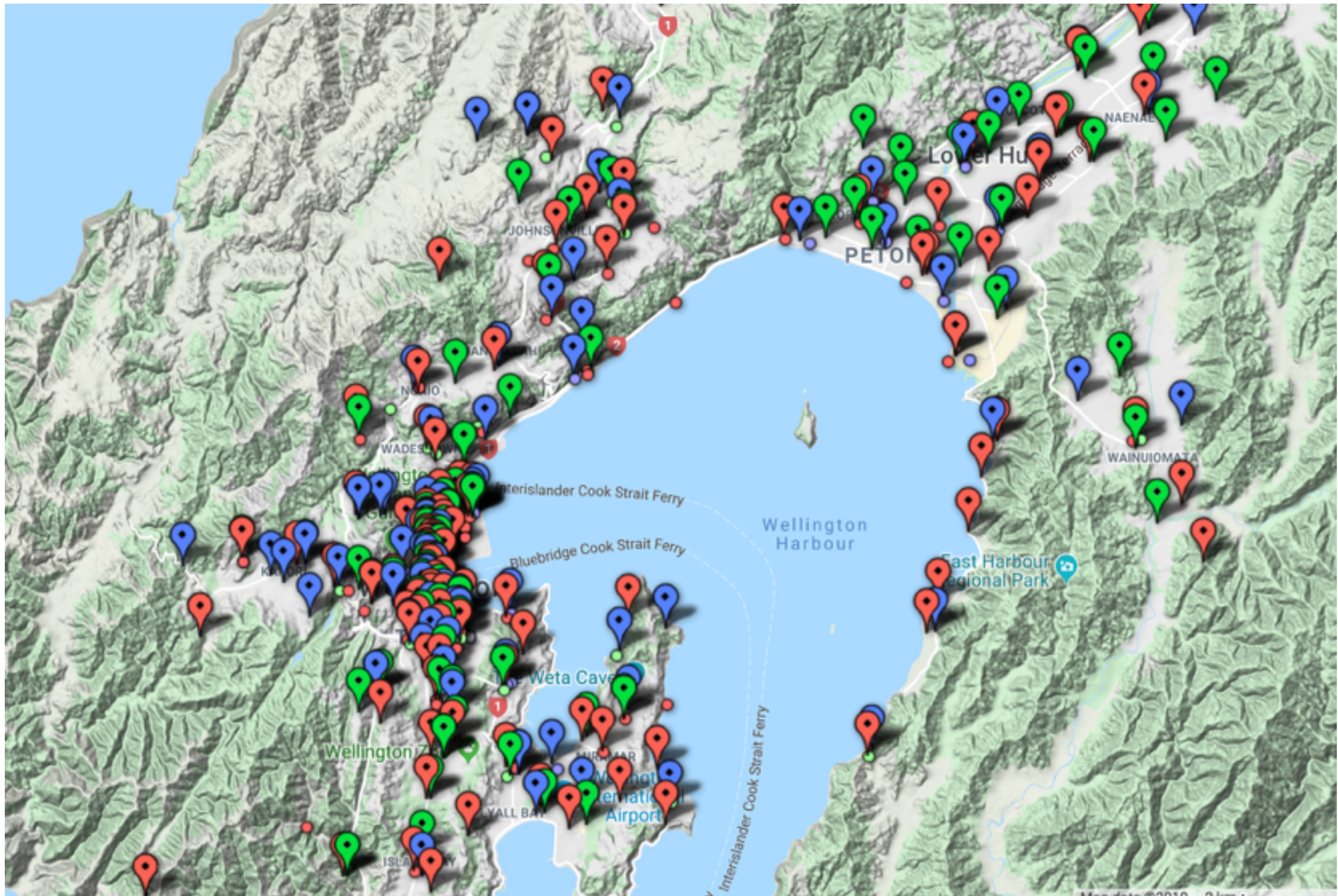
Main Sources

- Cell phone towers (approx 12 ranging frequencies)
- Cell phone calls, data, text, WiFi, bluetooth
- Residential and business WiFi
- Public WiFi
- Smart Meter Networks
- AM/FM Radio, TV signals
- Emergency Services
- Air traffic
- Amateur radio
- Harbour and railway traffic
- Civil defence, construction, DOC, Military, Red Cross, SAR etc



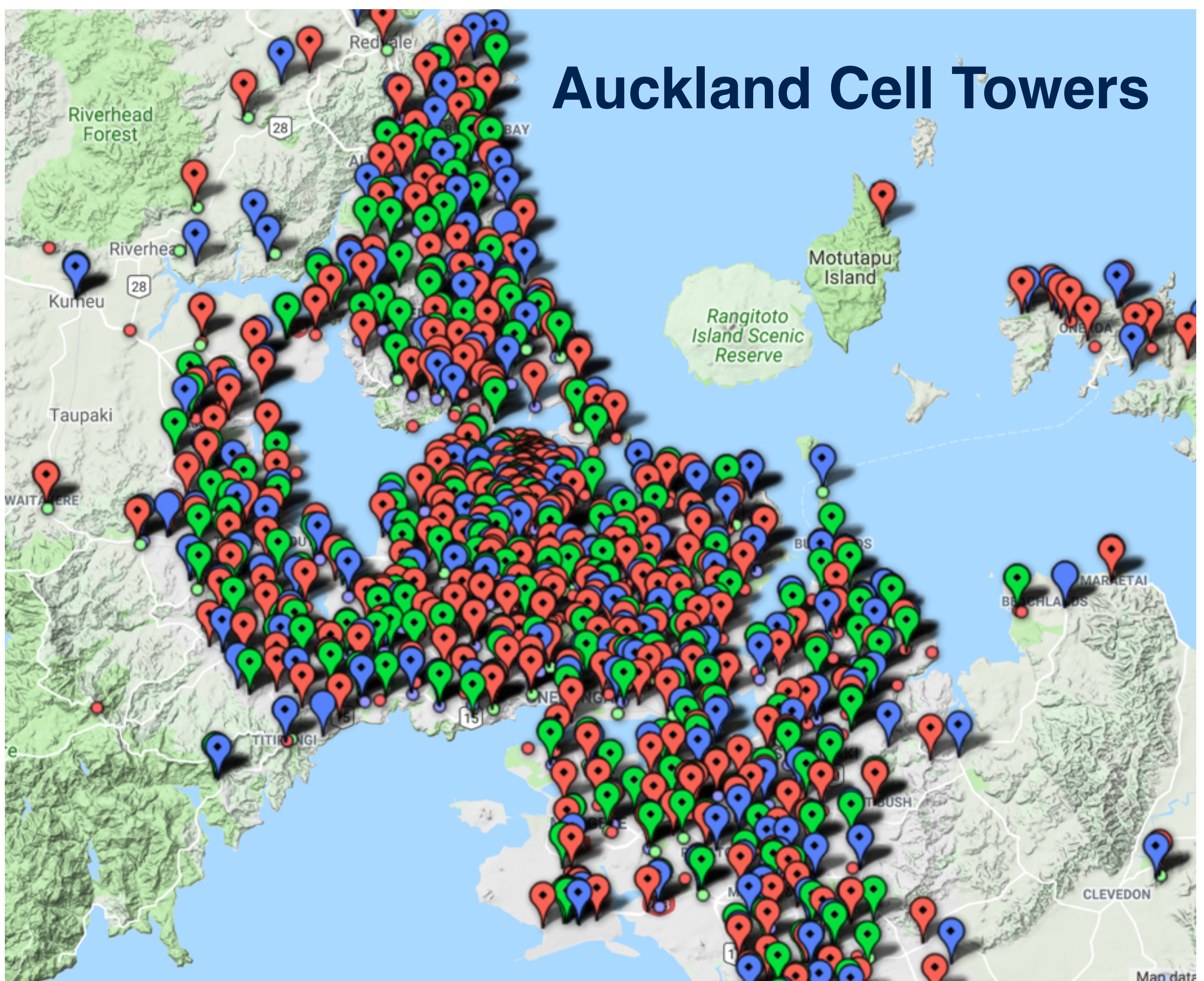
What does Wellington look like?

Cell Phone Tower Network



**Each marker has between 1 to 6 transmitters
on multiple pulsed modulated frequencies**

Auckland Cell Towers



Cell Phone Frequencies

NZ standard NZS 2772:1999

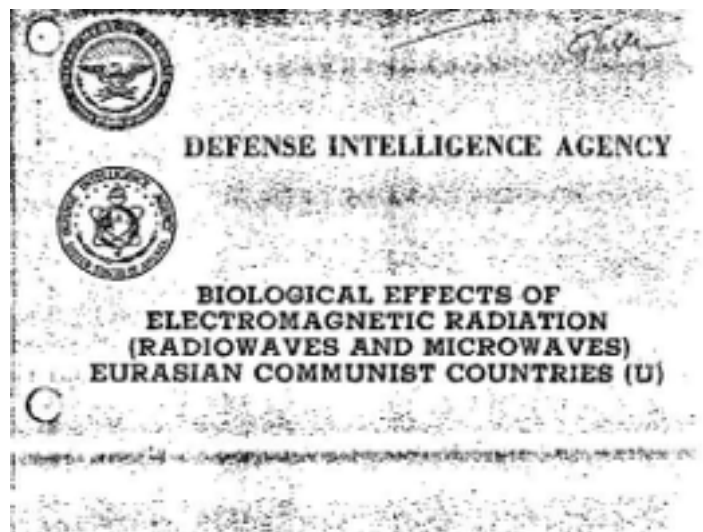
**Radiofrequency Fields - maximum exposure levels 3kHz to 300GHz
Published 20 years ago based on ICNIRP recommendations.**

Microwave data gathered from studies done in 1960's by US Naval research on an average sized male head from the military.

In the US during the 1960's, it was quickly adopted that there are no 'non thermal' effects from microwave radiation.



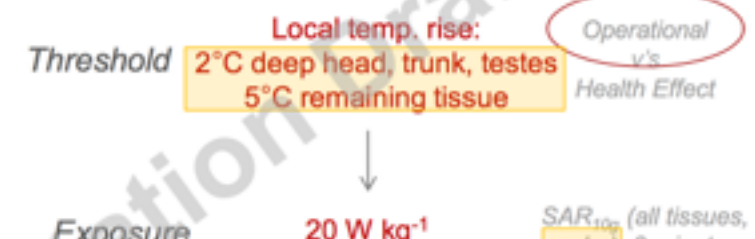
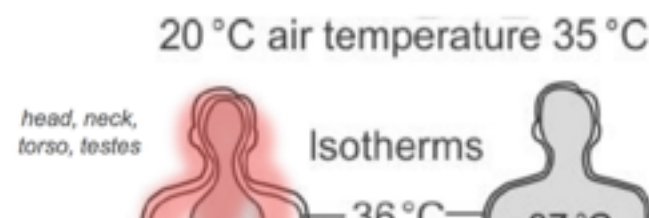
The model used by the FCC to test cell phone radiation safety is a **220-pound male**. Child and female models are not tested.



ICNIRP Radiofrequency Guidelines
Public Consultation Version
June 26th, 2018

AMERICANS for
RESPONSIBLE
TECHNOLOGY

Protection against local exposure (6-min) \leq 6 GHz: 'Head & Torso'



4G Cell Phone Radiation

In perspective

Microwave Radiation Exposure Limits	NZS 2772: 1999	Independent Group of scientists IGNIR	International Scientist Bioinitiative Report
1800MHz 4G Phone	9,000,000 $\mu\text{W}/\text{m}^2$	Day maximum 100 $\mu\text{W}/\text{m}^2$ Nighttime is 10 $\mu\text{W}/\text{m}^2$	1,000 $\mu\text{W}/\text{m}^2$

Worldwide Exposure Limits

USA	10,000,000 $\mu\text{W}/\text{m}^2$
Japan	10,000,000 $\mu\text{W}/\text{m}^2$
Australia	9,000,000 $\mu\text{W}/\text{m}^2$
New Zealand	9,000,000 $\mu\text{W}/\text{m}^2$
Chile	1,000,000 $\mu\text{W}/\text{m}^2$
Italy	100,000 $\mu\text{W}/\text{m}^2$
Russia	100,000 $\mu\text{W}/\text{m}^2$
Bulgaria	100,000 $\mu\text{W}/\text{m}^2$
China	100,000 $\mu\text{W}/\text{m}^2$
Switzerland	95,000 $\mu\text{W}/\text{m}^2$
Turkey	55,000 $\mu\text{W}/\text{m}^2$
Luxembourg	24,000 $\mu\text{W}/\text{m}^2$

1800MHz
4G Phone

<https://drive.google.com/file/d/1sghilzAf07e2dqVr4Dt9XKrNc3ms9SjS/view>

<http://www.safeinschool.org/p/microwave-exposure-limits-countries.html>

Smart Electricity Meters

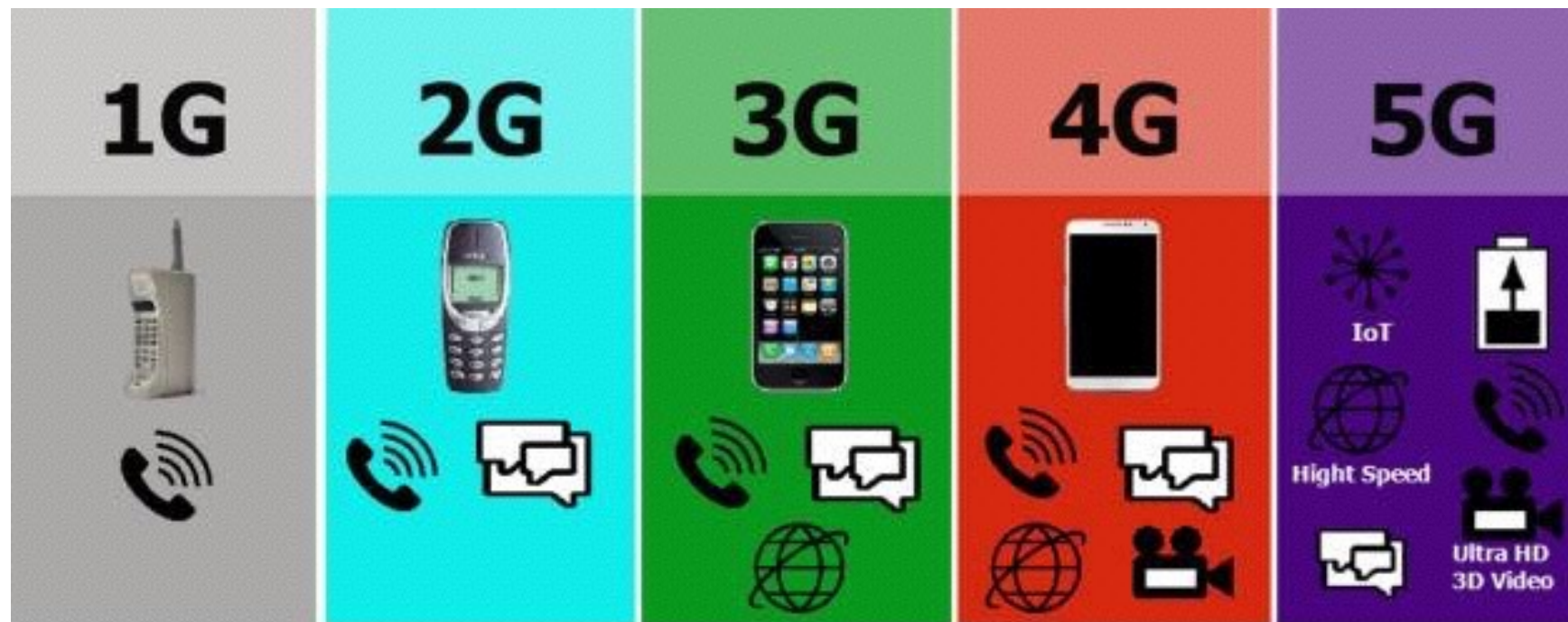


NZ is steadily rolling out the smart meter network

EMF Awareness:

- Emit strong radio frequency bursts (micro pulses)
- Produce dirty electricity (SMPS & HF)
- Strong magnetic fields

Next Generation - 5G



Two parts to 5G

5G being deployed now

Mid Band Frequency <6GHz

- Vodafone 3.5GHz
- Spark 2.6GHz
- 2Degrees ??
- Enhanced 4G
- New infrastructure + added to existing base stations
- Similar signal strength and continuous radiation

5G future intention

mm Waves >20GHz

- Not yet assigned to Telcos
- Densification of small cells
- Many more transmitters
- Signals on demand
- Beamforming
- Strong short intense beams



Millimeter
Waves



Small Cell



Massive
MIMO



Beamforming



Full Duplex

Big Tech Companies

Cisco prediction: By 2030

There will be
500,000,000,000 connected devices

Average of 60 devices per person

Each device includes sensors that collect data, interact with the environment, and communicate over a network. The Internet of Things (IoT) is the network of these connected devices. These smart, connected devices generate data that will be aggregated, analysed and deliver insight, which helps drive more informed decisions and actions.

The Distracted Future



Introducing 'Facebook Horizon,' a New Social VR World, Coming to Oculus Quest and the Rift Platform in 2020

Today at OC6, we unveiled Facebook Horizon, a new social VR world coming to Oculus Quest and the Rift Platform in 2020. A culmination of...

[Learn More](#) >



AC Magnetic Fields

AC electric current flowing through a conductor

Higher the load = stronger the magnetic field

Highest household contribution from:

Heaters

Kitchen appliances

3 way switches

Solar power

Smart meter

Circuit breaker panel

Wiring errors - unpaired neutrals

Coffee machines

Laptops

Fridges

Power tools

Hair dryers

Sources:

Line

Loop

Coils

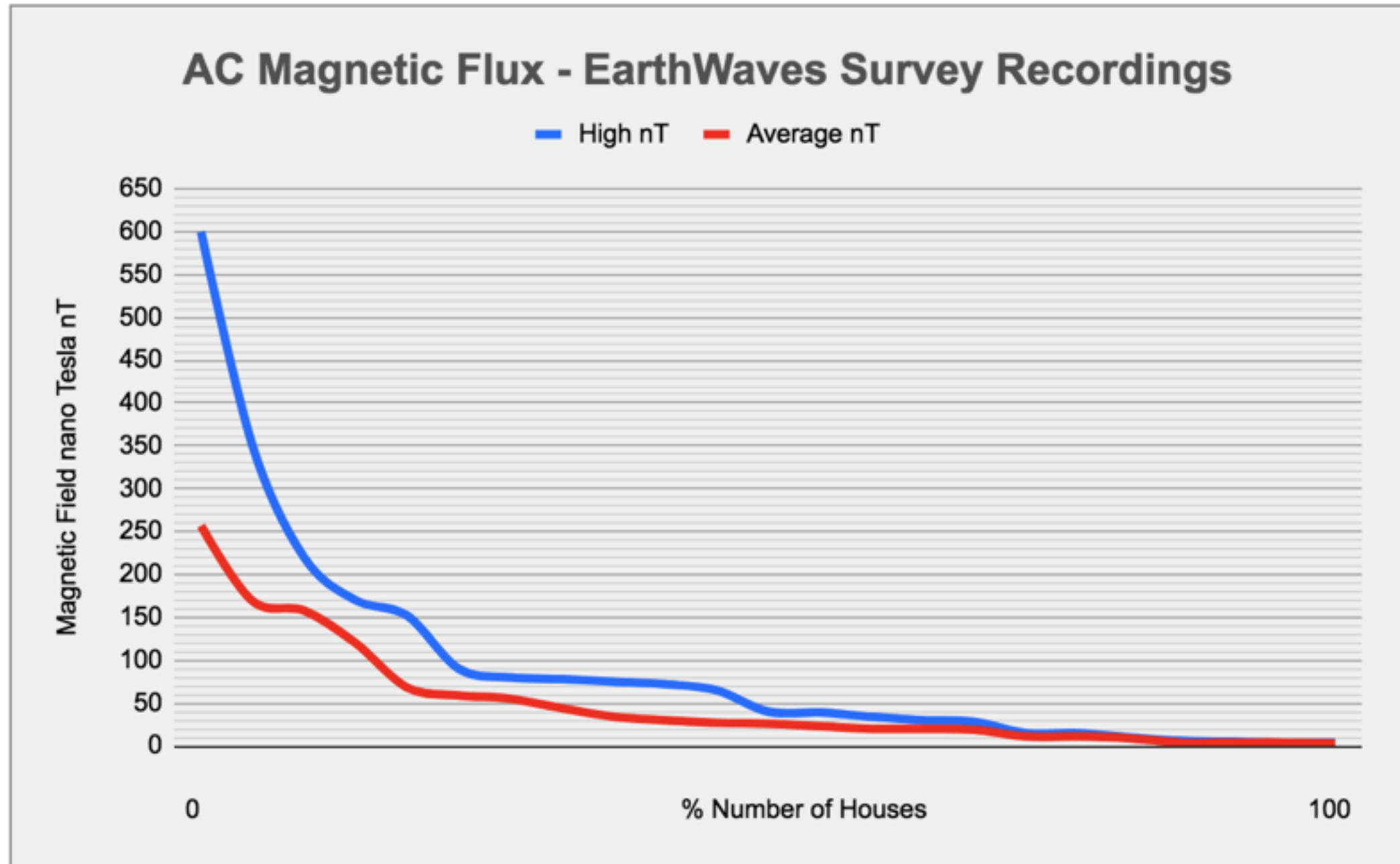
Outside contributions from:

Powerlines

Transformers

Utility infrastructure

AC Magnetic Fields



AC Electric Fields

Household circuits where voltage is present..

There is an electric field that extends out several feet..

Which can be measured on your body..

And this induces a micro current..

“external alternating electric field exerts forces on the charges within the human body, resulting in reversal (depolarization) and induction of body currents”

*We live, work, travel
and sleep in polluted
artificial electric fields.*



Modern houses

Have large amounts of electrical cabling for lights, switches, control panels, appliances, etc..

Creating a large electric footprint..

Which also acts as a very large antenna for other frequencies..

Light Pollution

Artificial lighting contain a number of stressors

Light noise

Flicker

Blue light hazard BLH

High colour temperature

Colour intensity

Multiple high frequencies

Dirty electricity

Modern lighting is a large contributor to altered circadian rhythms through disruption to our photoreceptors



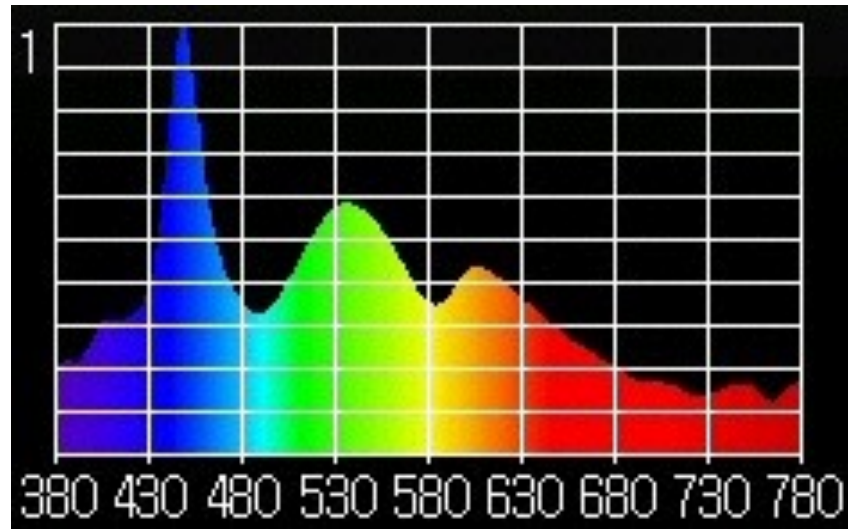
Results in photo oxidative damage

Parshad et al 1978

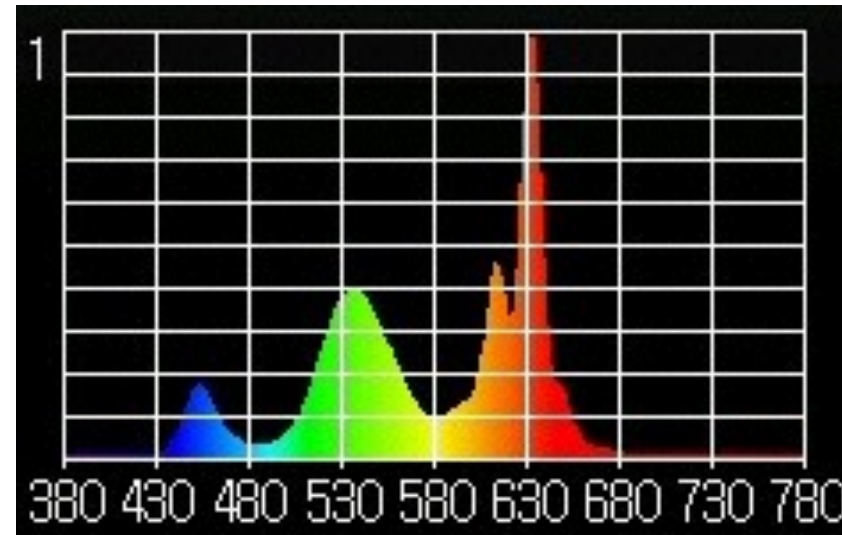
Ancestrally we evolved with no light after sunset

Light Spectrums

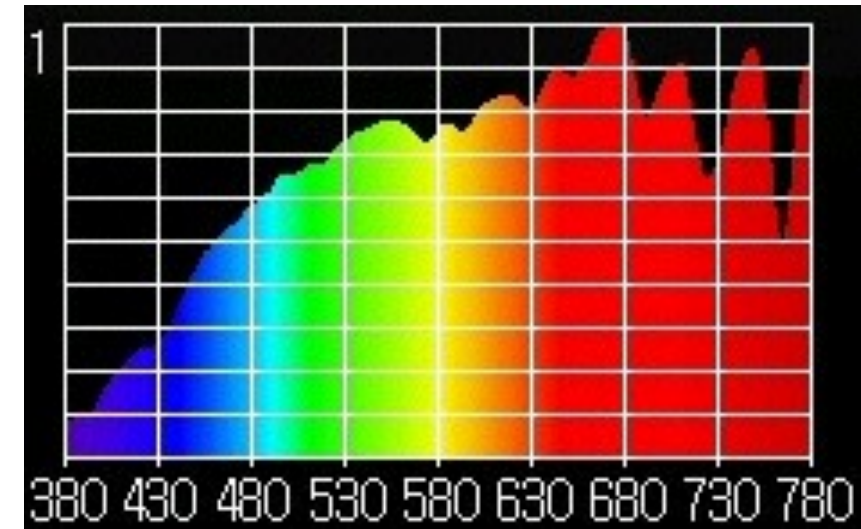
Laptop



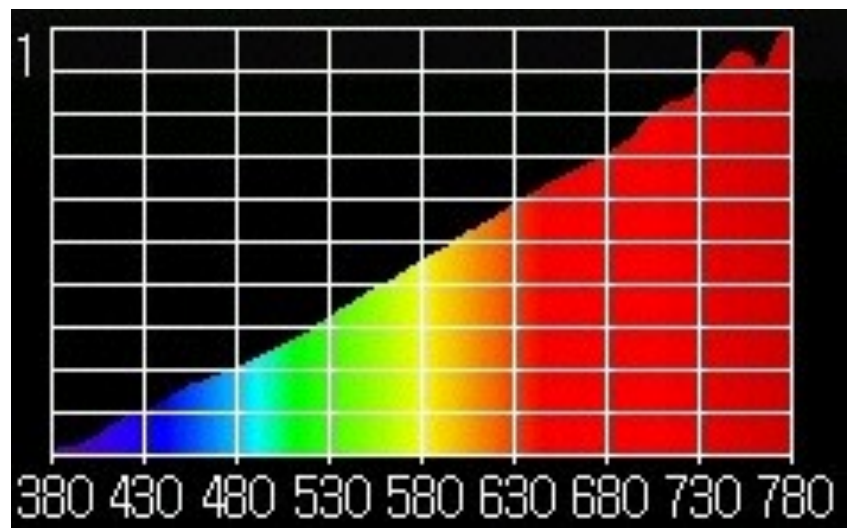
Phone with nightshift



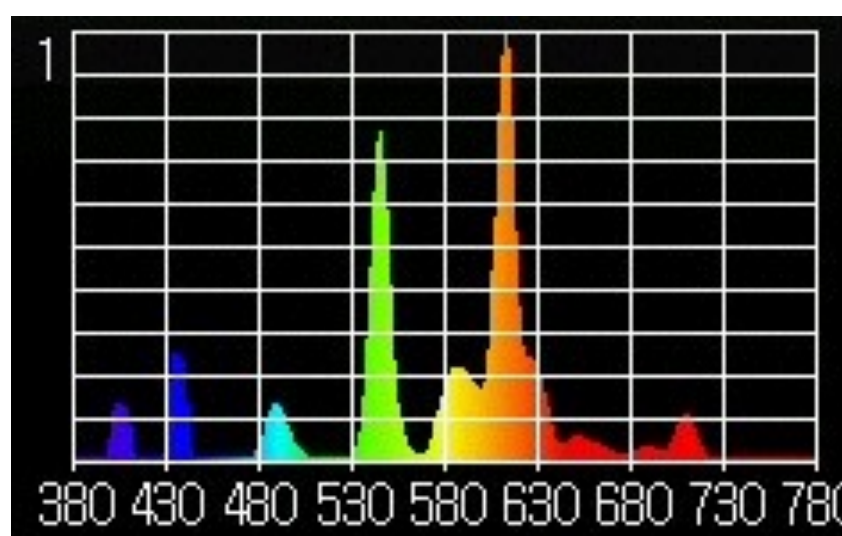
Sunrise



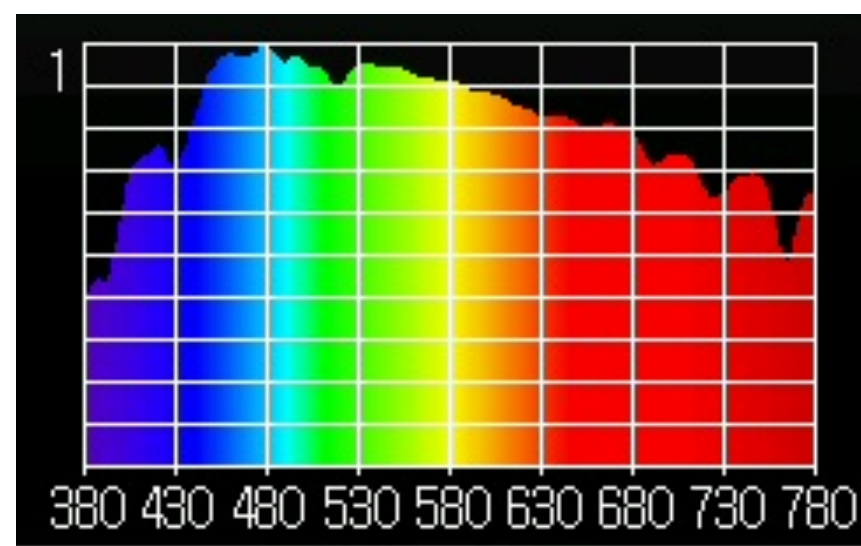
Incandescent Bulb



CFL Bulb



Full Sun 2pm



Electrosensitivity

ES or EHS formerly known as Microwave Sickness

Known also as Idiopathic Environmental Toxicity

Electrosensitivity is not recognised in NZ by MoH

“Canaries in the coal mine”

Symptoms:

Minor - Headaches, dizziness, brain fog, memory loss, irritability, anxiety, insomnia, fatigue, tingling, itching, burning, disorientation etc.

Major - Depression, arrhythmias, palpitations, blood pressure changes, increased heart rate, increased blood glucose etc..

Effectively ES is an allergy to EMF because you have lowered energy production and efficiency which means your body can't handle the stress.

Where does EHS come from?

Potential Lowered Redox = Level of Sensitivity

The human factor..

*Accumulation
of nnEMF
Exposure*

*Lifetime damage from
exposures work/home/travel*

*Other
Environment
Exposure
History*

*What other toxic environments
have you spent time in?*

*Connection to
Nature*

*Circadian biology
Grounding
Sunlight
Water
Seasonal Eating
Magnetism
Solar callus
Rewilding*

*Inherited
mDNA*

*Passed down from your mother.
What was your mother doing
when you were born?*

*Current
Habits
nnEMF &
nnLight*

*What do you expose yourself to now?
How much blue light?
How much WiFi?
How dehydrated are you?*

What can we do about EMF exposure?

EarthWaves 4 D's Process

Diagnose

Distance

Deactivate

Defend



EarthWaves
Electromagnetic Stress
Surveys

Protect Yourself

- Learn about the EMFs in your environment
- Know where cell phone towers are
- Reduce / eliminate exposures at home
- Be aware of other peoples habits with connected devices
- Understand your work place exposures
- Consider shielding if necessary
- Create a low EMF sleeping sanctuary
- If in doubt, get an EMF survey



"If you can't expose humans to microwaves in a lab, in a controlled environment--if you can't even do that ethically, because we have so much **evidence of harm**--then none of these technologies should be getting rolled out."

-Dr. Sharon Goldberg, MD

How to manage in an EMF world

Control the EMF in your own home

Radio Frequency

- Hardwire internet, phone and TV/media
- Stop using WiFi
- Reduce wireless devices
- Replace smart meter
- Corded phone
- Control cell phone calls
- Remove the microwave oven
- Consider not buying a 5G device

Dirty Electricity

- Know what contributes to DE
- Turn off
- Filter out

Lighting

- Use Incandescent bulbs
- Low light at night
- Use of red lights
- Avoid night time blue light

Electric/Magnetic Fields

- Recognise the big items
- Heaters
- Under floor heating
- Induction hobs
- High current items

CREATE A LOW EMF SLEEP SANCTUARY

What about shielding?

Radio Frequency

Shielding paint (grounded)
Shielding materials/Fabrics
Windows films
Wire mesh
Bed canopies
Under bed mats
Faraday cages
Clothing and hats

Electric Fields

Create distance
Turn off
Relocate
Earth/ground
Shield cabling

Magnetic Fields

Create distance
Turn off
Relocate
Some shielding is possible but costly

In Closing

DID YOU KNOW...

ENVIRONMENTAL
HEALTH TRUST



CHILDREN ABSORB CELL PHONE RADIATION DEEPER INTO THEIR BRAIN THAN ADULTS.

Relative to an adult, children can absorb 2x the amount of microwave radiation into their brain and 10x the amount into the bone marrow of their skull.

EHTrust.org

#PracticeSafeTech

Ghent, Belgium school officials banned Wi-fi from pre-schools and daycares in 2014 due to health concerns.

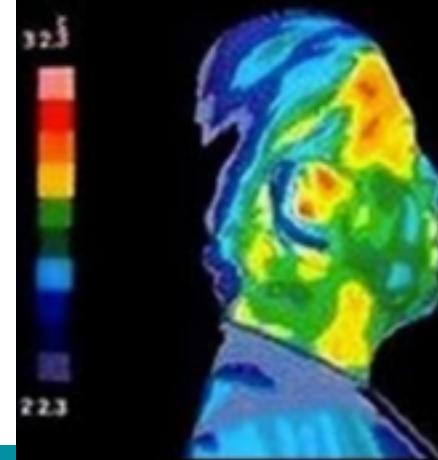


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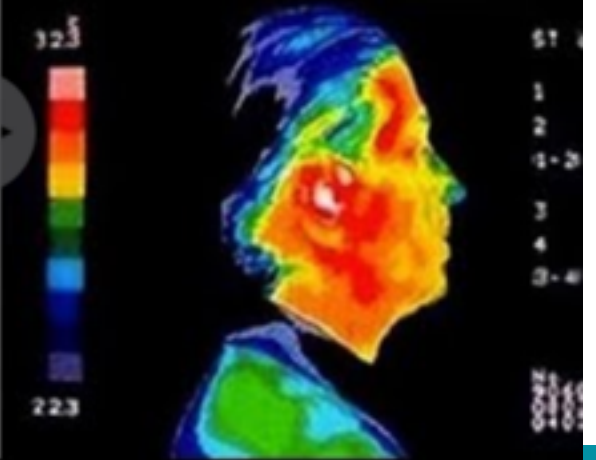


<https://www.facebook.com/5GFreeNewZealand/>

Before
cell phone use



After 15 minutes
of cell phone use



DID YOU KNOW...

ENVIRONMENTAL
HEALTH TRUST

WIRELESS DEVICES EMIT RADIATION 24/7

Corded connections do not emit radiation. Disable all wireless transmitters when not in use, particularly when handing a device to a child. Set Airplane Mode ON with Wi-Fi OFF & Bluetooth OFF.

EHTrust.org

#PracticeSafeTech

