BENCHMARK ENVIRONMENTAL

EMR INSPECTION REPORT

Prepared for:	Nicola Richardson

Concerning:	xx

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Inspection Date:	January 13 - 2021

Please note portions of this Report have been removed for Privacy.

This is to provide a sample of the kind of detail about how your home, your environment may be harming you and your loved ones.

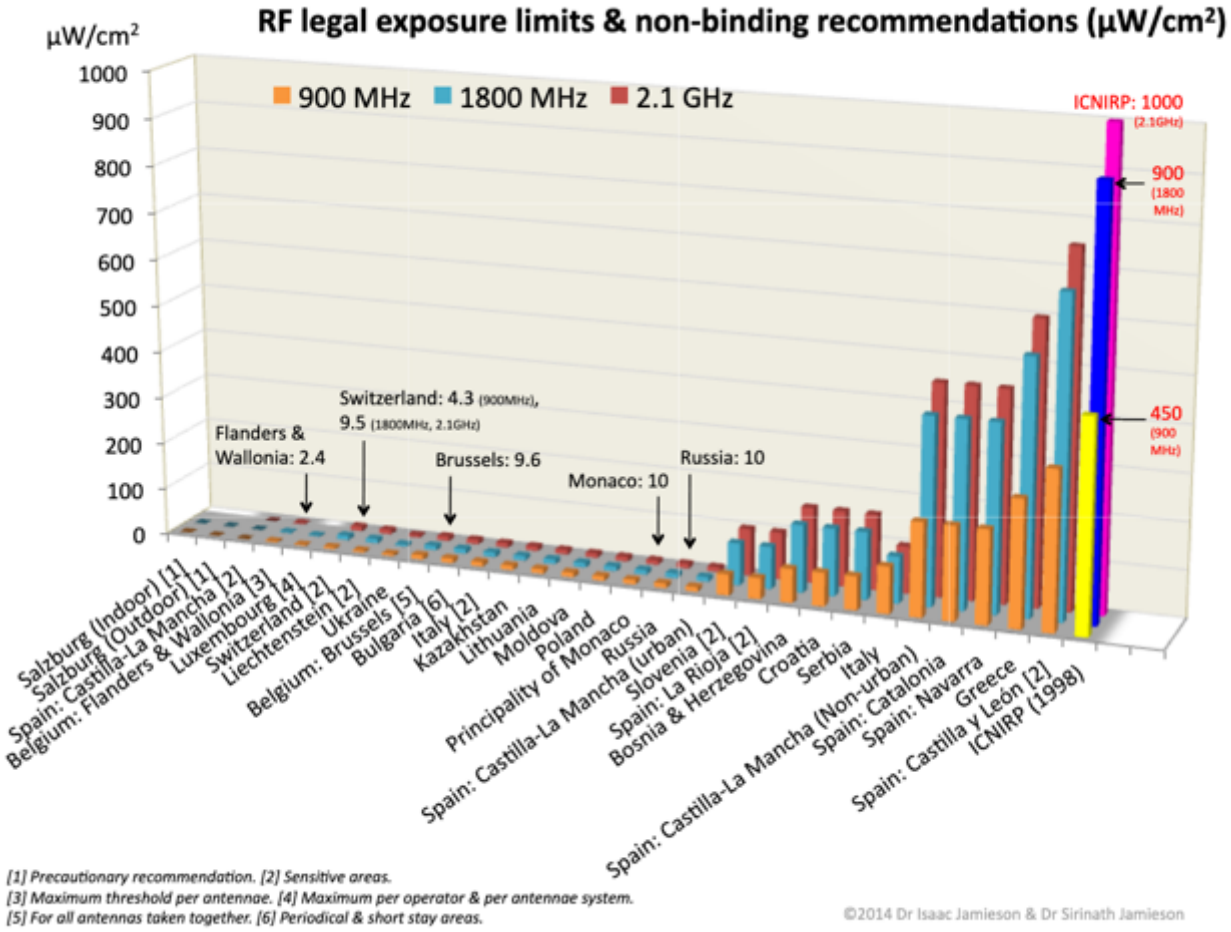
BENCHMARK ENVIRONMENTAL

RF International Guidelines:

Please note that is only for the 1800MHz range, technology is typically now much higher in frequency.
Cell towers still fall below the standards of Canada but are above many of the other locations.

International Radio Frequency "RF" Exposure Limts for 1800 MHz Range
(Cell phone, Wifi,Smart Meters, etc.)

Location	Reference	Exposure Time	Limit Based On	uW/m2	V/m
Most of Western Europe	IEEE C95.1-1999	30 minutes	Thermal/Heating	10,000,000	61.4
USA	(FCC) IEEE C95-1-1999 and ICNIRP	30 minutes	Thermal/Heating	10,000,000	61.4
Canada	Safety Code 6, Table 5 (2015)	6 minutes	Thermal/Heating	4,393,278.40	40.7
Russia	Sanitary Norms and Regulations 2.2.4/2.1.8.055-96	3 hours +	Biological Effects	100,000	6.14
China	UDC 14.898.5 GB 9175-88	3 hours +	Biological Effects	100,000	6.14
Italy	Sanitary Norms and Regulations 2.2.4/2.1.8.055-96	3 hours +	Biological Effects	100,000	6.14
Most of Eastern Europe	Sanitary Norms and Regulations 2.2.4/2.1.8.055-96	3 hours +	Biological Effects	100,000	6.14
Switzerland	Ordinance of Protection from Non-ionizing Radiation (NISV)	Long Term	Precautionary	100,000	6.14
Toronto Board of Health, Canada	Proposed 1999	Long Term	Precautionary	100,000	6.14
Bio Initiative Report	Bio-Initiative Report 2007	Long Term	Biological/ Precautionary	1000	0.614
Salzburg Resolution on Mobile Telecommunications	Preventative public health protection, Salzburg, June 7-8 2000	Long Term	Precautionary	1000	0.614
European Parliament	Resolution 1815, Strasburg, May 27, 2011	Long Term	Precautionary	106	0.2
European Academy for Environmental Medicine (EUROPAEM)	EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF realted health problems and illnesses DOI 10,1515/reveh 2016-0011	Long Term	Precautionary	100	0.0614
Building Biology Guidelines (Sleeping Areas)	SBM 2008 – Level of No Biological Concern	Long Term	Precautionary	0.1	0.00614
Natural Cosmic Radiation	MAES 2000	Long Term	Natural Exposure	0.000001	6.14E-08
Average Indoor Urban Exposure Vancouver, Canada	NotoxCity Building Biology	Long Term		200-5000	0.3-1.4



[1] Precautionary recommendation. [2] Sensitive areas.
[3] Maximum threshold per antennae. [4] Maximum per operator & per antennae system.
[5] For all antennas taken together. [6] Periodical & short stay areas.

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AC Electric and AC Magnetic Field International Guidelines:

International EMF Exposure Limits for AC Electric and AC Magnetic Fields 50/60Hz
(High Voltage Power Lines, Home Electrical Wiring, Power Cords, Appliances)

Location	Reference	Limit Based On	AC Magnetic Field mG	AC Electric Field V/m
Canada	ICNIRP 1998	Nerve and muscle Stimulation	833	5000
USA	ACGHI 1998	Nerve and muscle Stimulation	1000	25000
Russia	RNCNIRP 2008	Residential Exposure	50	
Germany	DIN/VDE	Nerve and muscle Stimulation	50000	5000
Sweden	MRP	Biological/ Precautionary	3	25
Sweden	TCO	Biological/ Precautionary	2	10
Switzerland	NISV	Biological/ Precautionary	10	
Netherlands	Rijkosverheid (new installations)	Biological/ Precautionary	4	5000
WHO "possibly carcinogenic"		Biological/ Precautionary	3 to 4	
Bio-Initiative Report	Bio-Initiative Report 2007	Biological/ Precautionary	1	
US Congress	Recommendation 1996	Biological/ Precautionary	2	10
Building Biology Guidelines Germany (Sleeping Areas	SBM2008 - Level of Slight Biological Concern	Biological/ Precautionary	1	1.5
Natural Radiation	MAES 2008	Natural Exposure	0.0002	0.0001
Average Indoor Urban Exposure Vancouver, Canada	Benchmark Environmental	Measurement with GigaHertz Meters	0.2 to 2	5 to 25

Summary of what was done:

The following are the findings based on a single snapshot in time.

The graphs below show in detail what is happening and the levels reached during the logged periods.

Further long-term analysis and testing would be required to thoroughly evaluate the electromagnetic fields and air quality at this location.

I have done my best to make this part of the report easy to follow and I completely understand if there is uncertainty after reading the data. I am available by phone/email/text if you have any questions.

Note: Outside was 70% Relative Humidity and 8 degrees Celsius(from online historical data).
The temperature is inversely proportional to the strength of radio waves and the relative humidity in the air is inversely proportional to the strength of radio waves. The higher the temperature and humidity the weaker the radio frequency

Understanding the graphs:

Standard Deviation: Variations from the average. A low standard deviation indicates that the data points tend to be close to the mean (also called the expected value) of the set, while a high standard deviation indicates that the data points are spread out over a wider range of value

95th Percentile: 95% of the events occur at this value

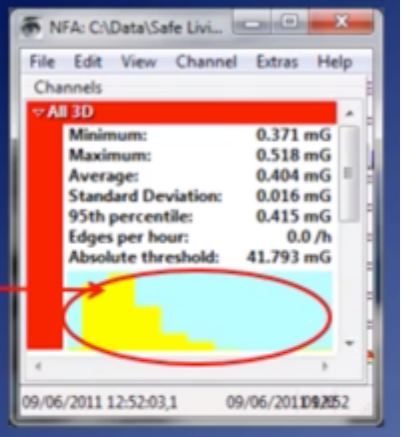
Edges/hour: High frequency transients greater than 2KHz – Microsurge electrical pollution

Absolute Threshold: Used to set a level for edges/hour.
R<2KHz 3D: This is an average of all 3 x axis measurements of all the frequencies below 2KHZ minus 60Hz and its harmonics. The histogram – is coloured to building biology guidelines view picture below.

NFA Soft

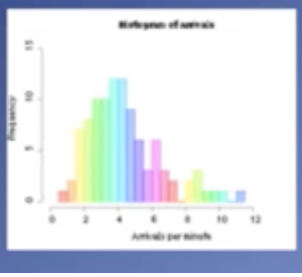
Program Statistics Channels

Histogram - light blue area
- **Colour indicates Building Biology Guidelines**
  - Green – No Concern
  - Yellow – Slight
  - Red - Severe
  - Purple – Extreme

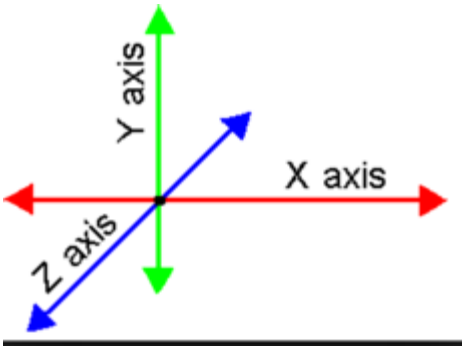


X axis
- how often the minimum value has occurred during a given time interval (left side)
- max value on (right side)

Y axis
- higher points indicate most common measured intensities
- Lower points indicate least common measures intensities



To the right is a diagram of the axis's of the NFA1000
The Y-Axis if the meter is standing up right top to bottom
The Z-Axis through the center face
The X – Axis is side to side.



AC Magnetic Readings:
5Hz and 1000KHz
Measurements are in milligauss (mG)
(caused by stray electrical current, point sources, and high current)

Note: The red line is the strength of the field in a combination of all the frequencies. The green line 60 Hz. The orange line is the 120Hz harmonic. The blue line is 180Hz harmonic The purple line is the remaining frequencies < 2KHz. The black line is all frequencies >2KHz.

Main Areas of Concern:

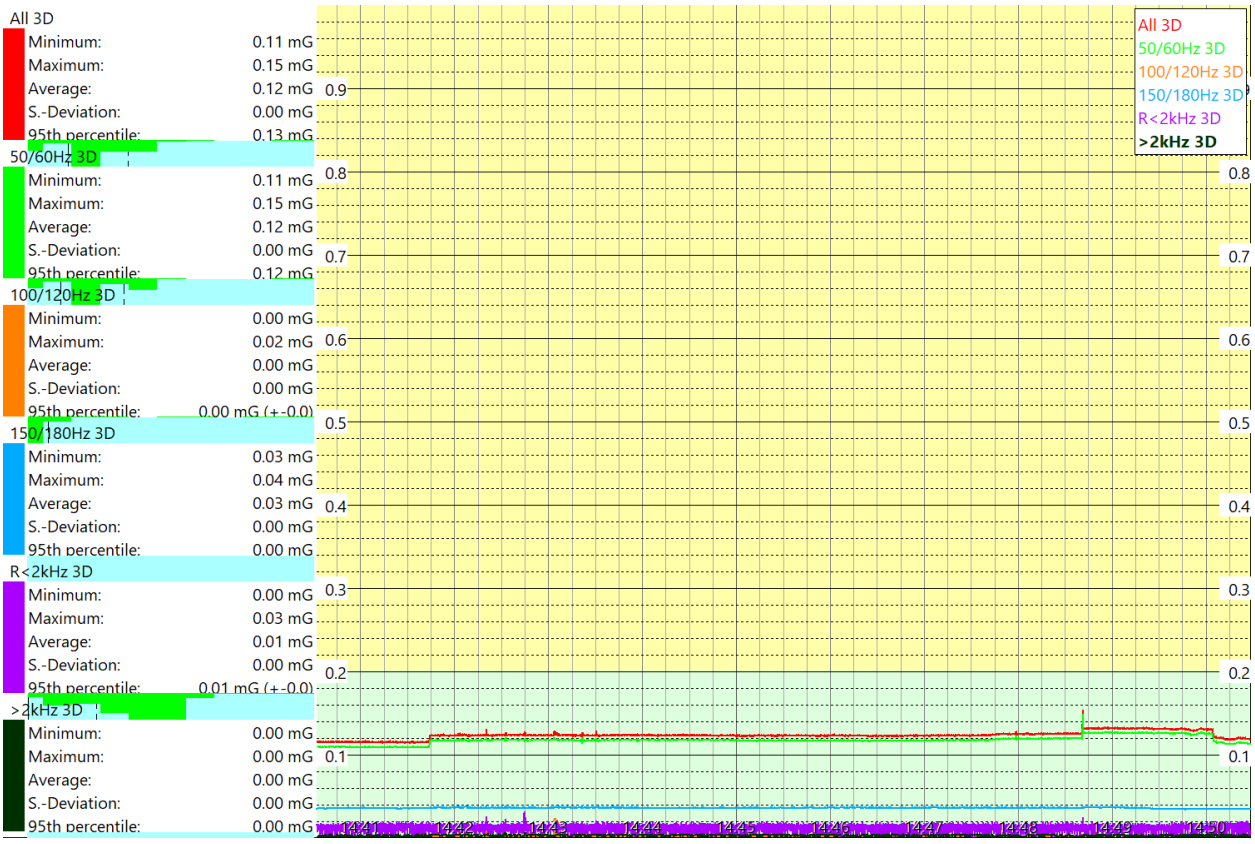
Pillar in Living room at 3 mG
Kitchen Appliances form 0.2-4mG based on distance
Gym ceiling approx. 1.5mG

Examples of logged AC magnetic fields shown on the next few pages.

BENCHMARK ENVIRONMENTAL

Home Average-Basement Office (No Concern)

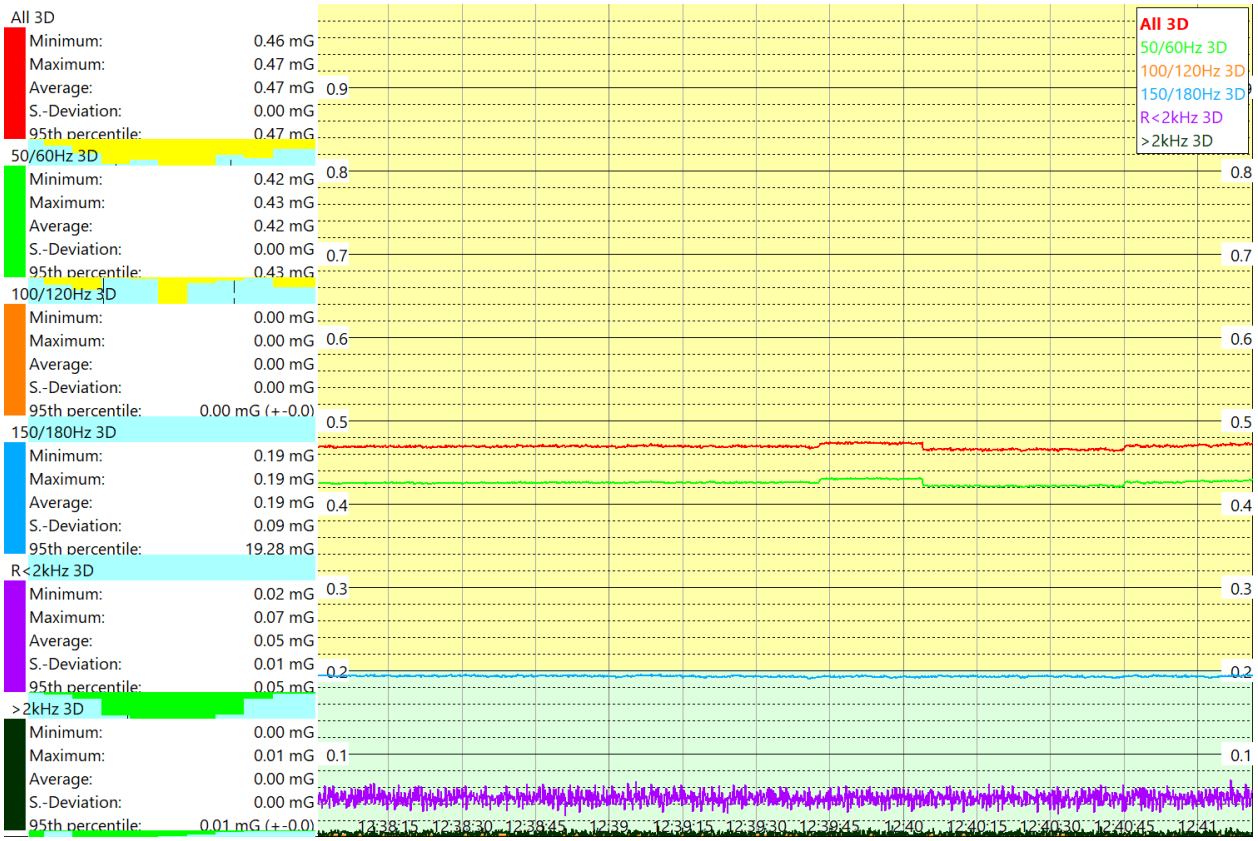
Below is a graph of the AC Magnetic field located in basement office. The magnetic field is in the no concern category. The majority of this field is caused by the internal wiring in the home and some residual from the nearby transmission line. This level is fabulous in an urban living space. There were a couple anomaly/ hot spots. Appliances and the electrical panel would present at a much higher level. Any rooms not listed were same as the home average.



BENCHMARK ENVIRONMENTAL

Living Room Couch (Slight Concern)

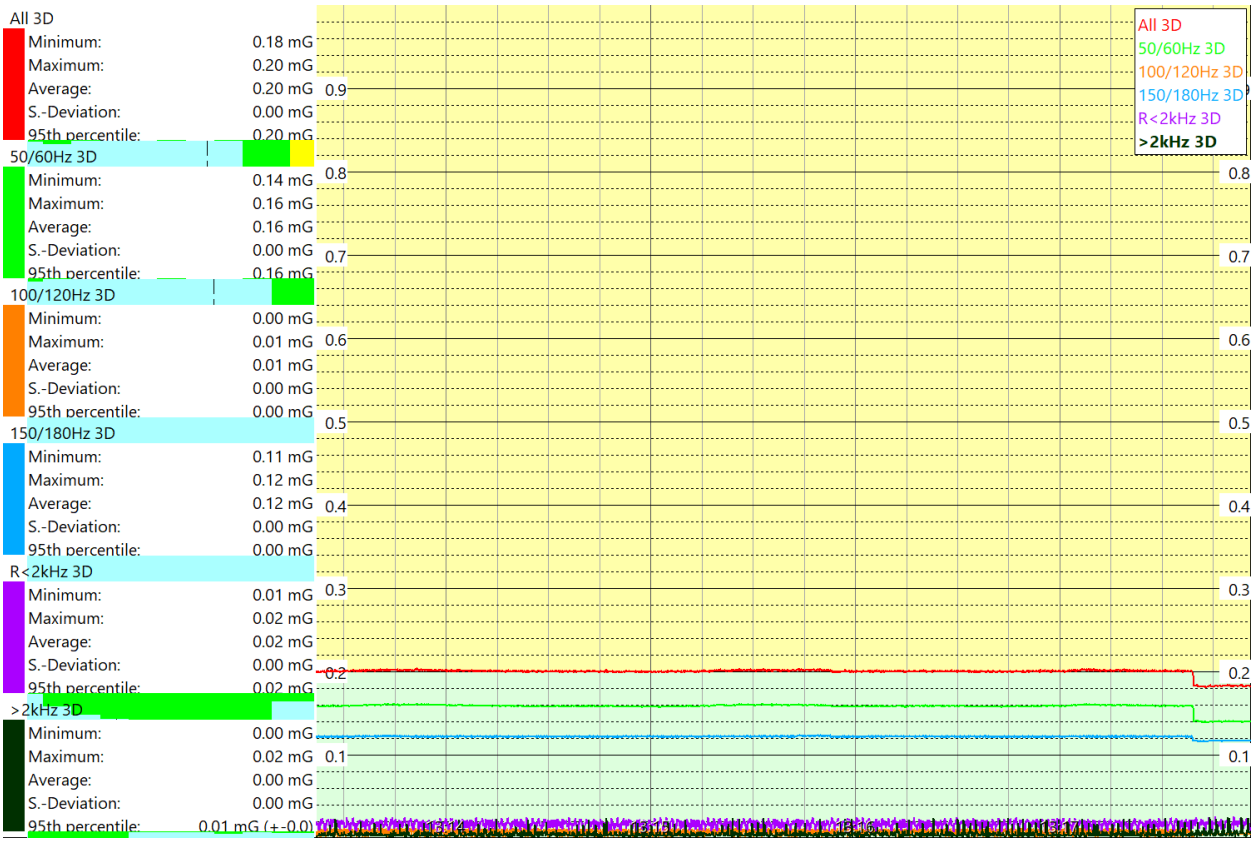
Below is a graph of the AC Magnetic field located on the couch. The field is coming from a pillar wall photo on the right. The red line shows the strength of that field utilizing the frequencies. The magnetic field is in the slight concern category. The majority of this field is caused by a wiring error in one of the circuits nearby. The field dissipates after about 6 feet.



BENCHMARK ENVIRONMENTAL

Top floor office (No Concern)

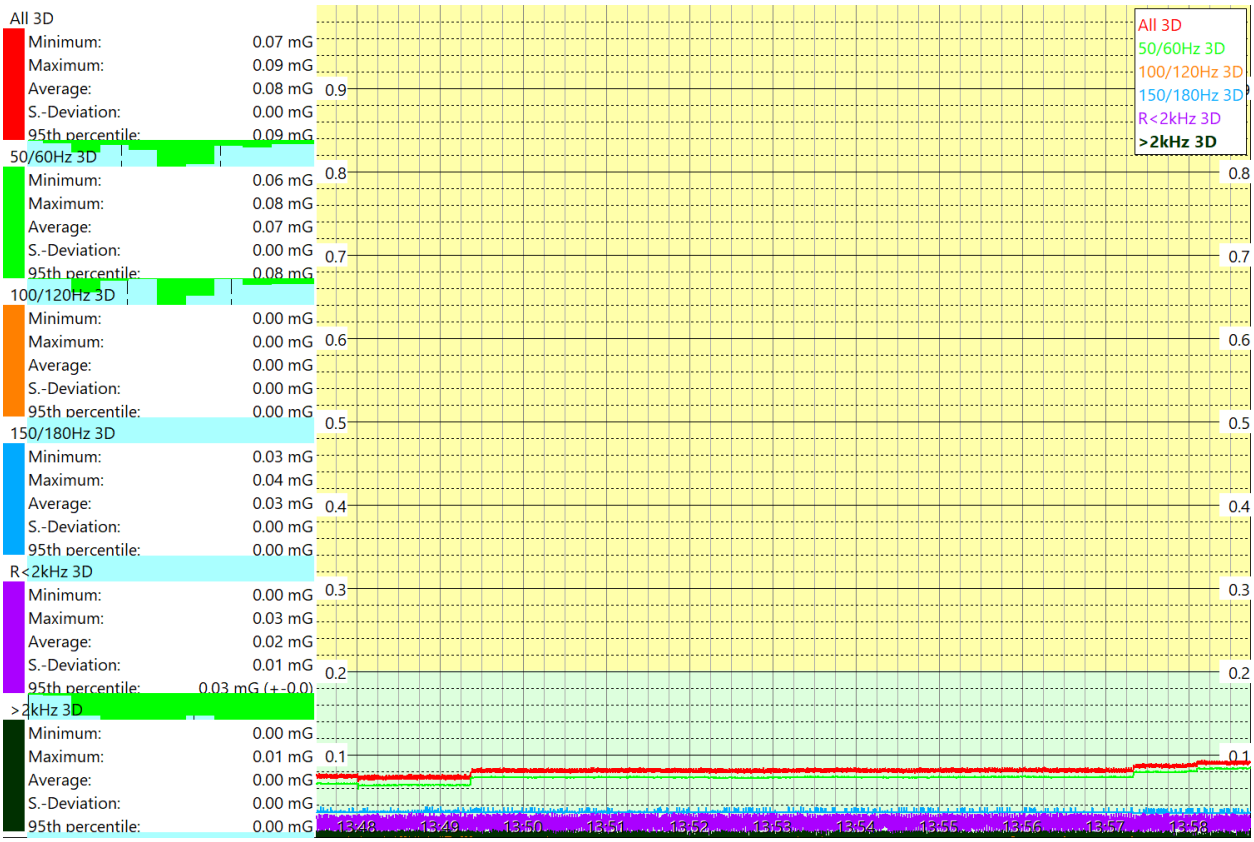
Below is a graph of the AC Magnetic field located on the desk.



BENCHMARK ENVIRONMENTAL

Master Bedroom (No Concern)

Below is a graph of the AC Magnetic field located center of bed.

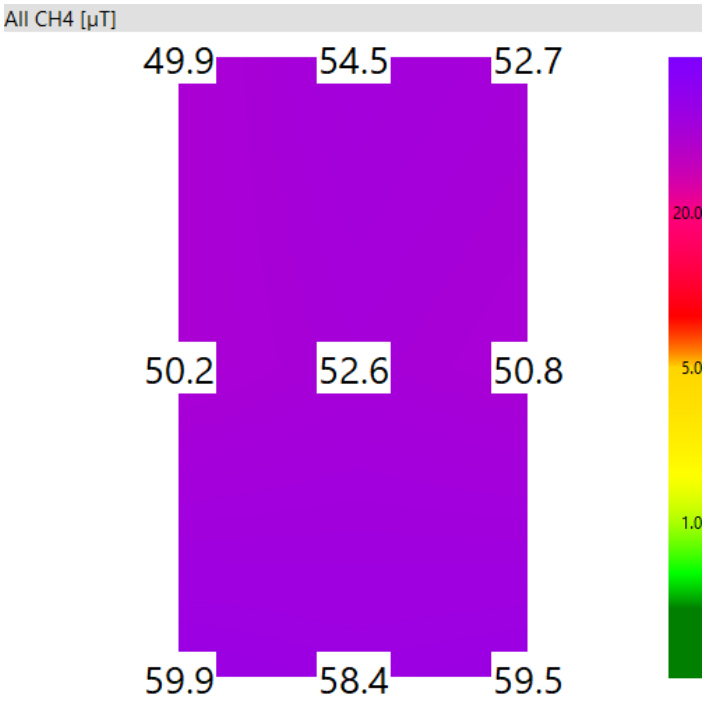


DC Magnetic Readings:
5Hz and 1000KHz
Measurements are in micro Tesla

This measurement is a bed map of the changes in flux in relation to the Earth's Magnetic Field. The colour we see here is of no concern. We will focus on the deviation in the numbers. We want to keep the deviations to around 5 micro Tesla. Possible causes of large flux change is the bed's metal springs and frame then metal ducting and lastly the Earth's magnetic lines.

Master Bed

The bed has low deviations and is within standards.



AC Electric Field Readings:
(caused by voltage, difference measured point to point in volts/meter) 5Hz to 1MHz
The MicroSurge Electro Pollution is combined in these numbers and averaged in as a total.

Note: The red line is the strength of the field in a combination of all the frequencies. The green line 60 Hz. The orange line is the 120Hz harmonic. The blue line is 180Hz harmonic The purple line is the remaining frequencies < 2KHz. The black line is all frequencies >2KHz.

Main Areas of Concern

Basement Bedrooms were extreme levels of severe to extreme electric fields 4 – 15 V/m
Desk workstations have extreme levels 10 -18 V/m
Master Bedroom severe concern 1.5 – 4.5 V/m
Mitigation techniques are documented in the Executive Summary.

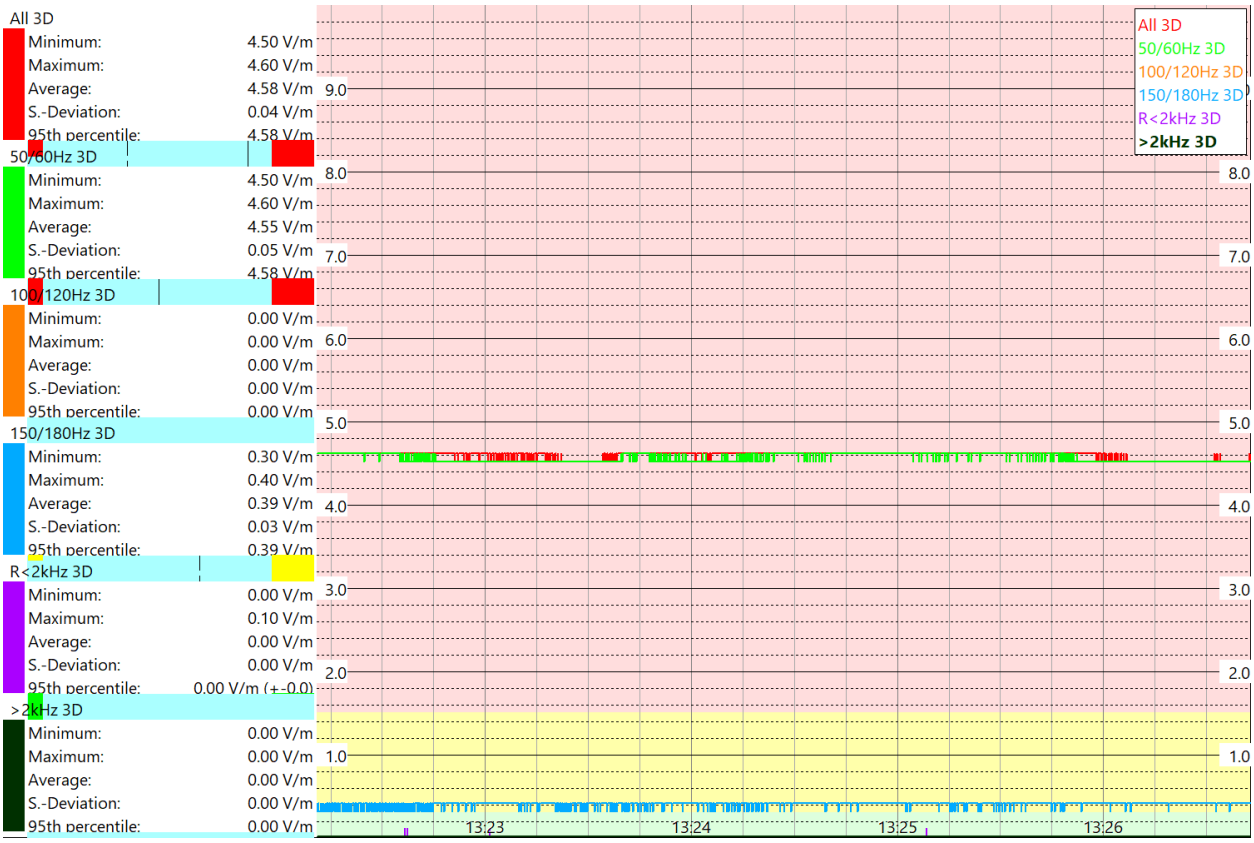
Examples of logged fields shown on the next few pages.

BENCHMARK ENVIRONMENTAL

Master Bed (Severe Concern)

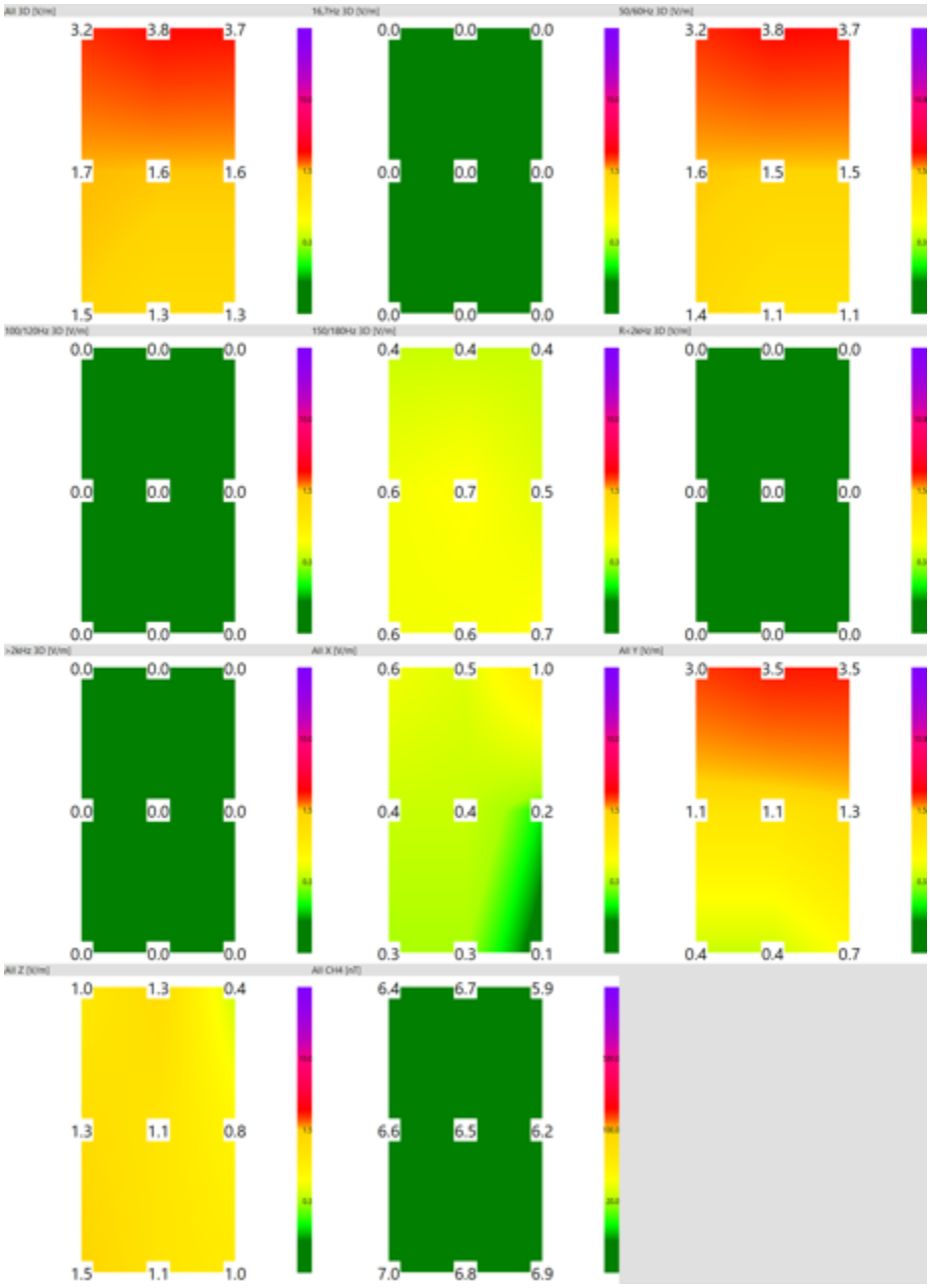
Below is a graph of the AC Electric field in master bedroom in the middle of the bed near the head board.

Additionally in this graph is Microsurge Electrical Pollution (dirty electricity) in orange, blue, purple and black, which reaches the severe category for building biology standards.



Master Bed map (Slight - Severe Concern)

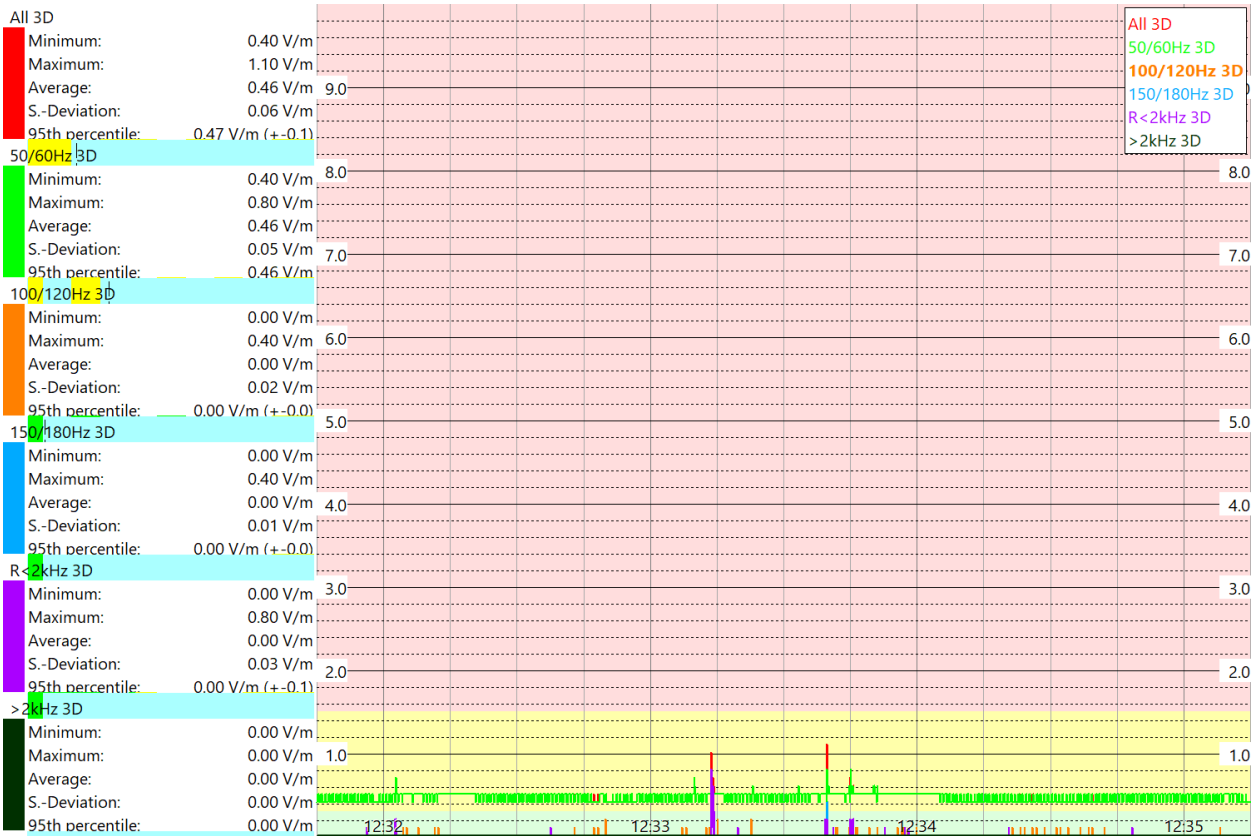
This shows the flow of the field throughout the bed location.



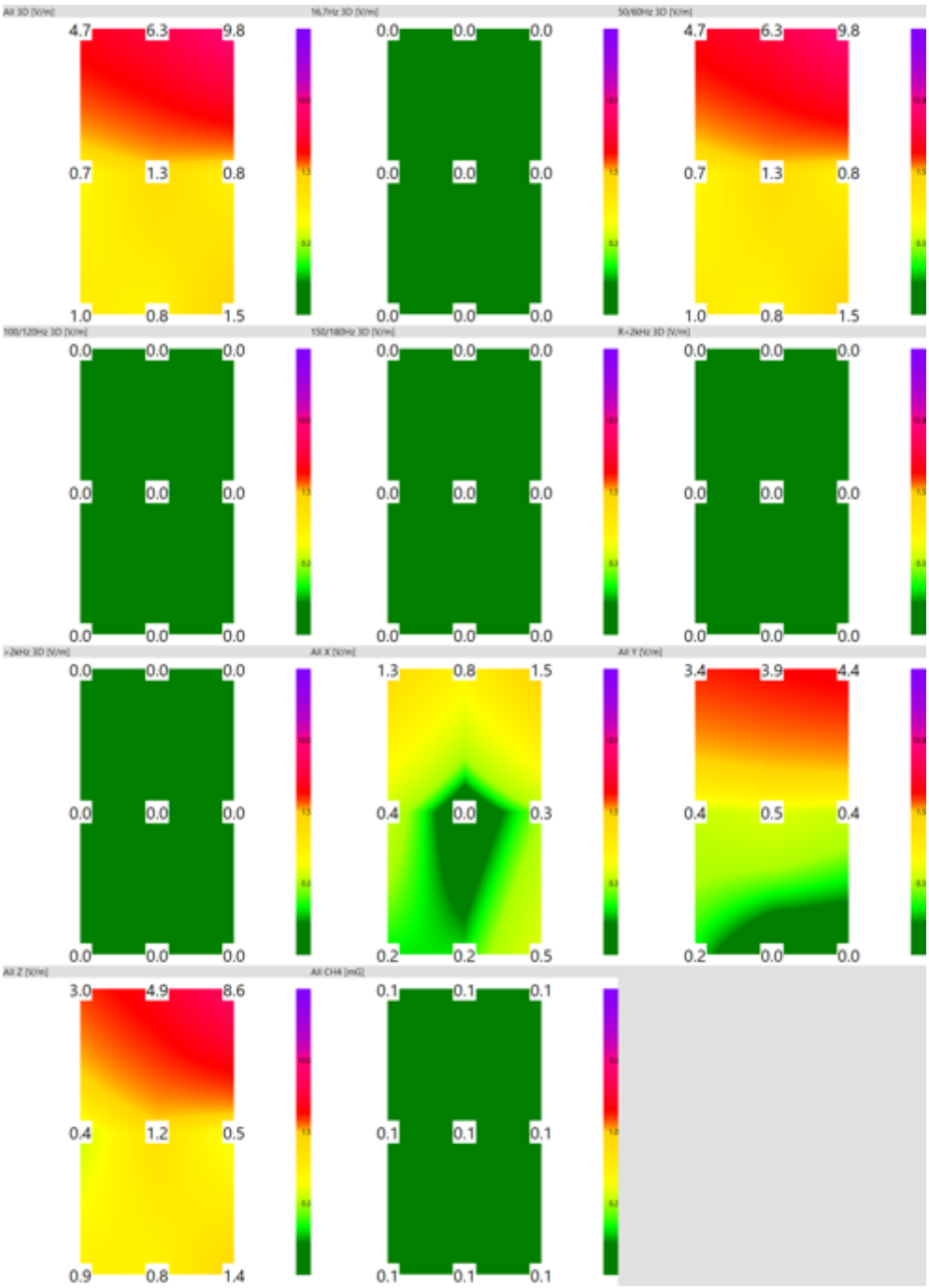
Living Room couch (Slight Concern)

Field was measured on the couch nearest to the problem pillar.

Additionally in this graph is Microsurge Electrical Pollution (dirty electricity) in orange, blue, purple and black, which reaches the severe category for building biology standards.

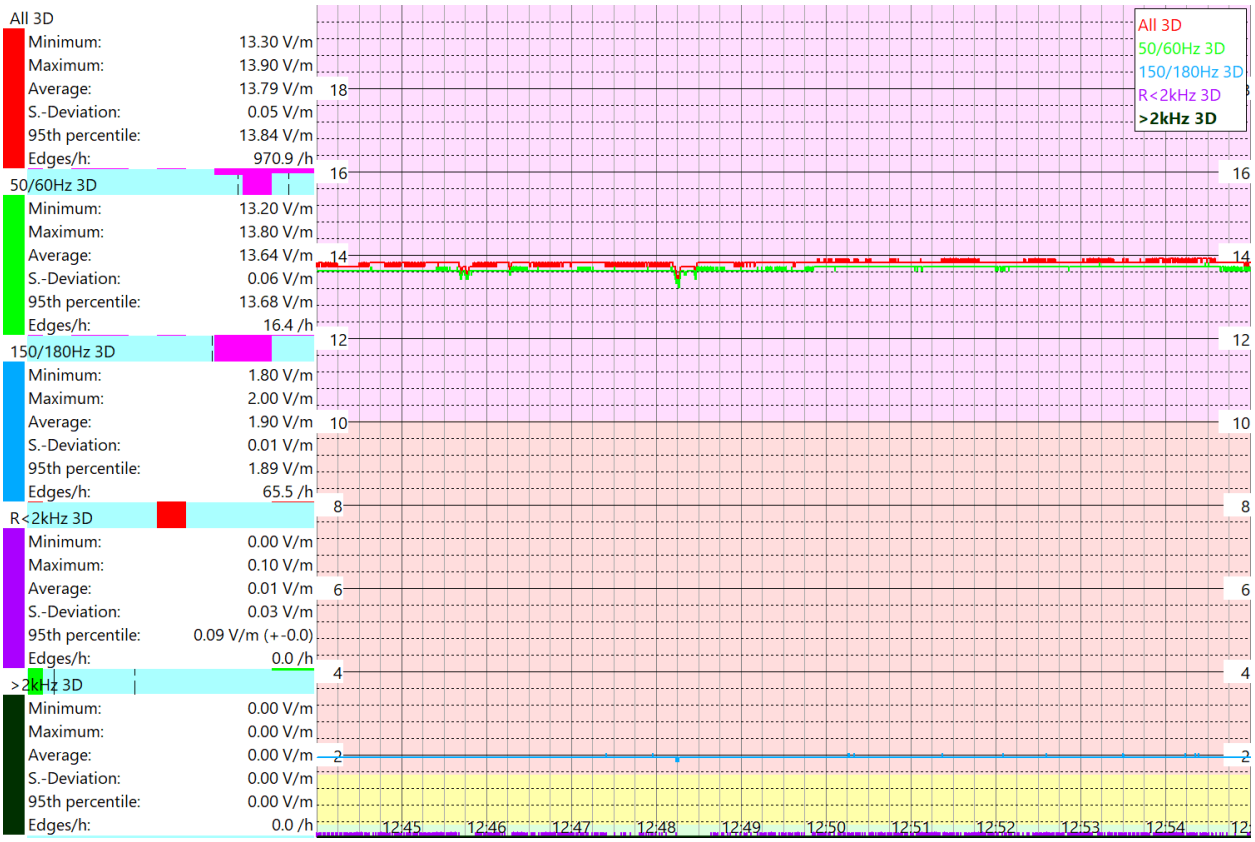


Guest Bed (Queen size bed) map (Severe Concern)



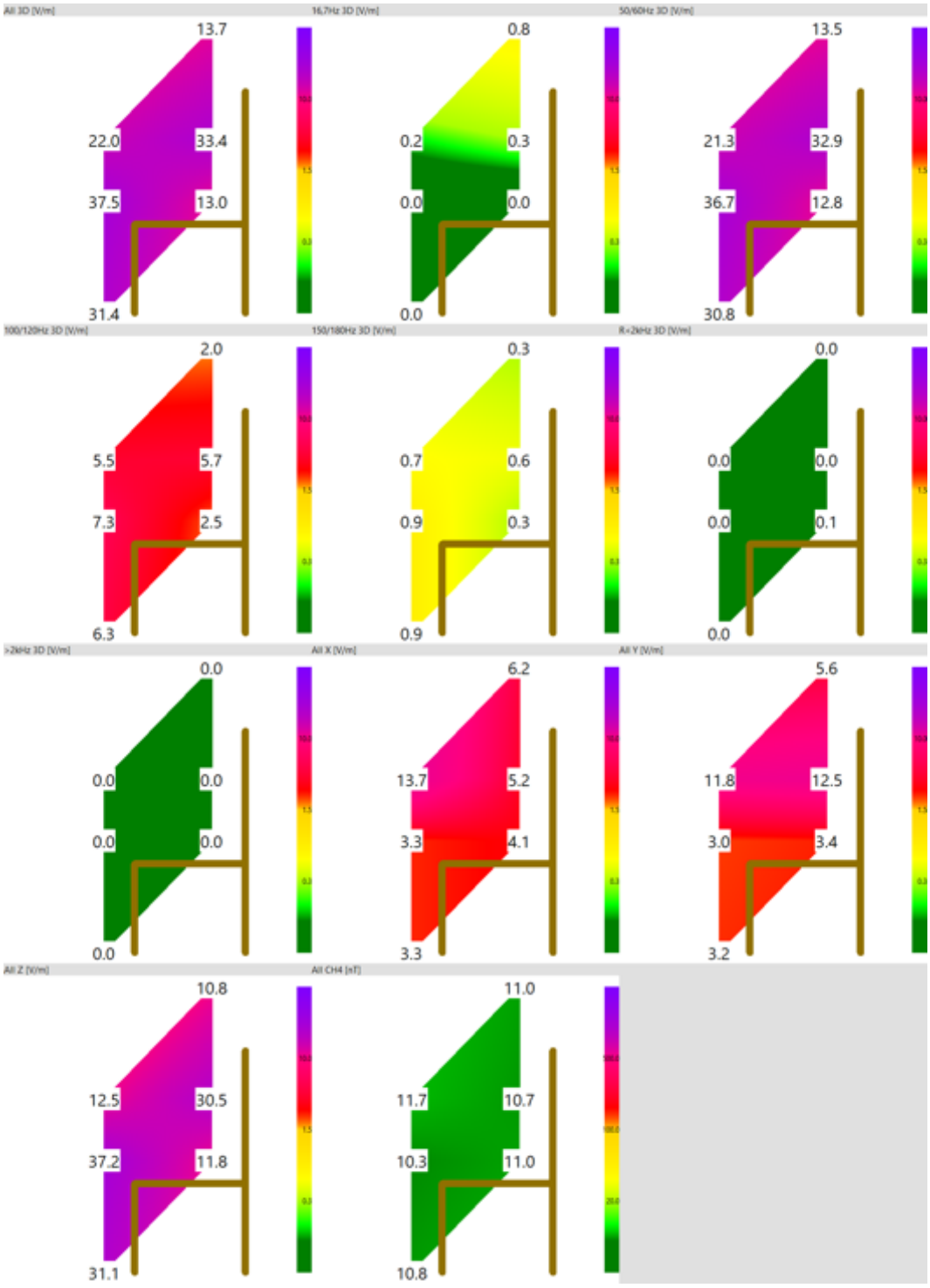
Kitchen (Extreme)

Measurement taken near the stove on the counter.
Note: These levels are normal for kitchens due to proximity of appliances.
Microsurge Electrical Pollution (dirty electricity) in orange, blue, purple and black, which reaches the severe category for building biology standards.



Basement Office chair map (Extreme)

Note: These levels are normal for office desks due to proximity of appliances.
Microsurge Electrical Pollution (dirty electricity) in orange, blue, purple and black, which reaches the severe category for building biology standards.

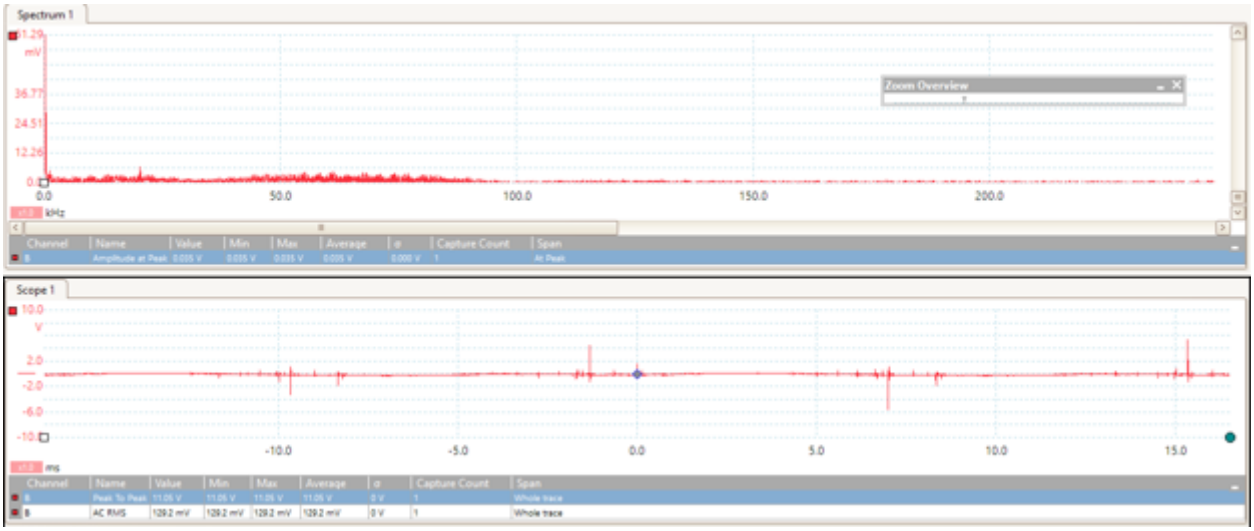


Microsurge Electrical Pollution

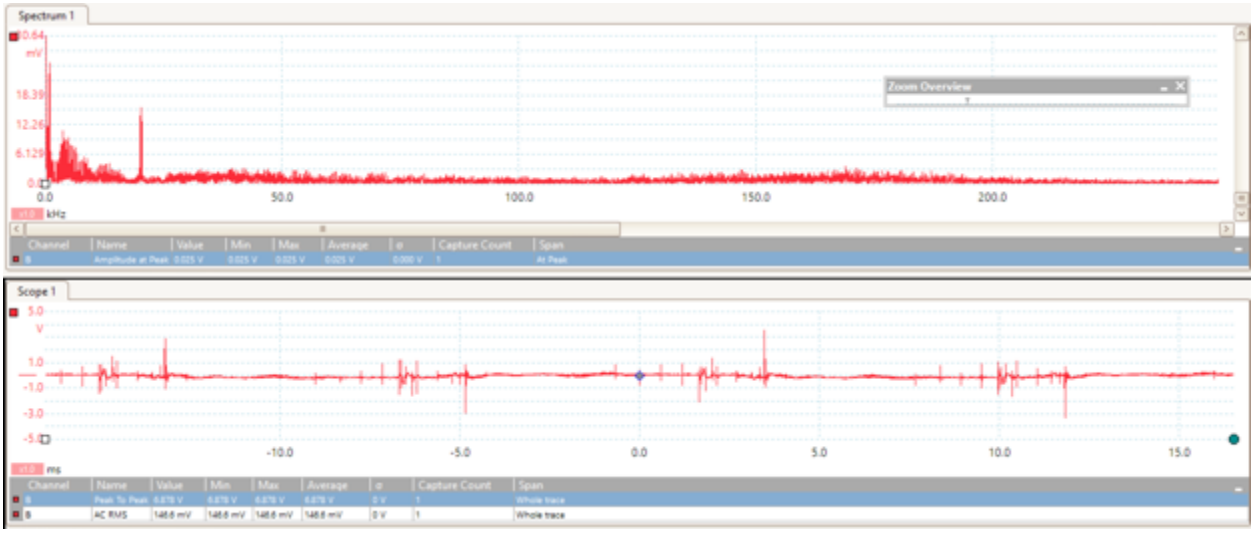
Measured with a Spectrum Analyzer and Oscilloscope. There are very different standards on measuring as there are three ways to measure this type of field. You're your home fluctuates depending on which circuit is tested. In the end we want your home's readings and as close to flat line as possible. To get there, Electrical filtration will help and usually gets you to at least 50mV in some areas. The rest has be done by removing dimmers, LED bulbs. Greenwave filters are a great option for your home.

Below are examples of what the transient electricity looks like at different locations and with filters being used or not.

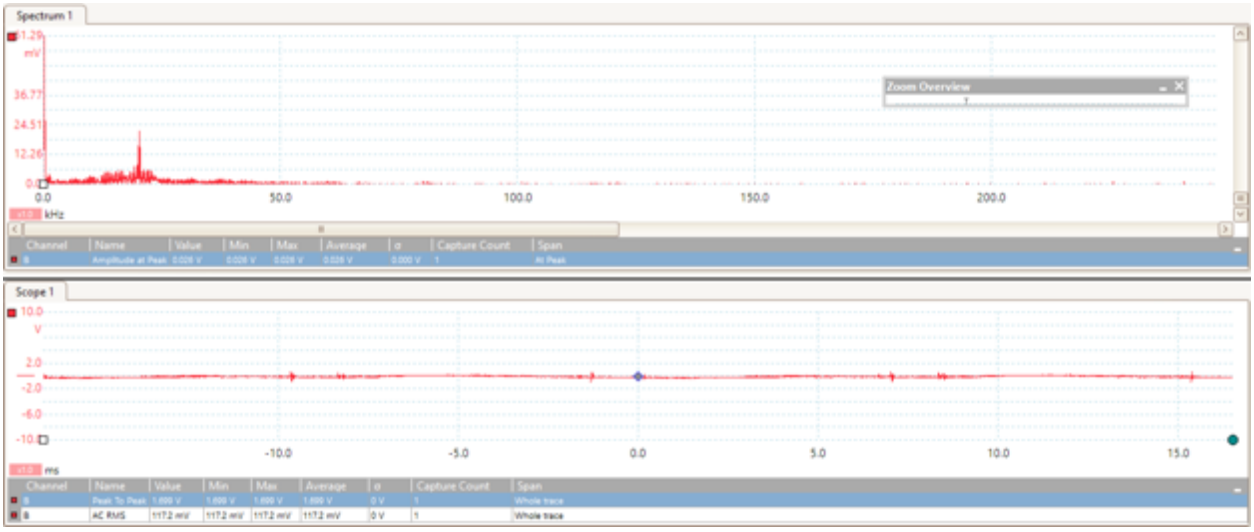
Mechanical Room Hot/Neutral - no filter



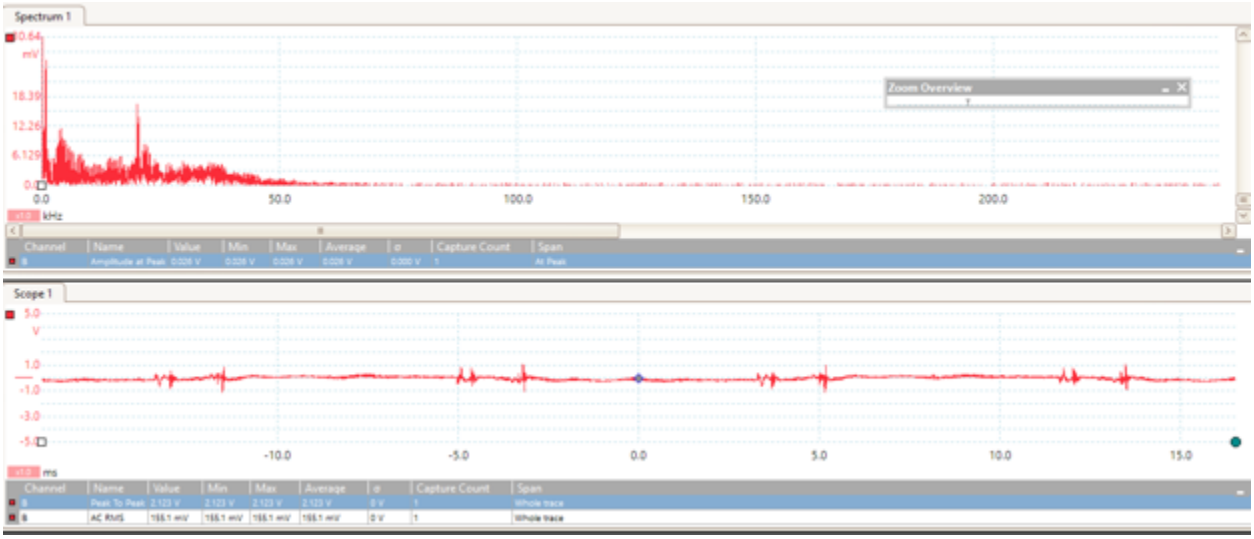
Mechanical Room Ground/Neutral - no filter



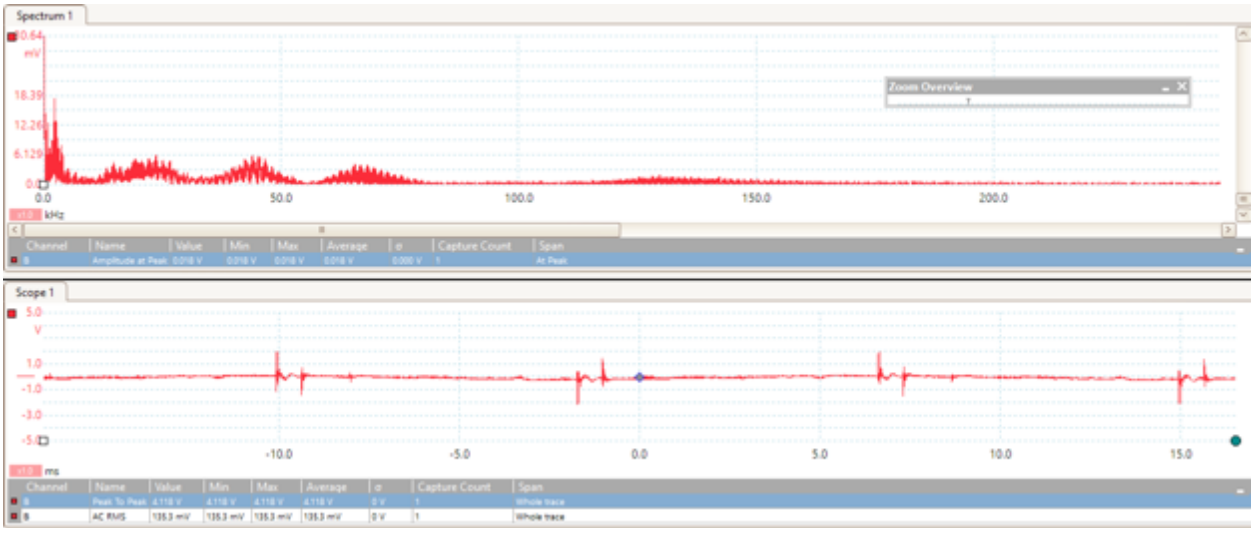
Mechanical Room Hot/Neutral - SineTamer filter



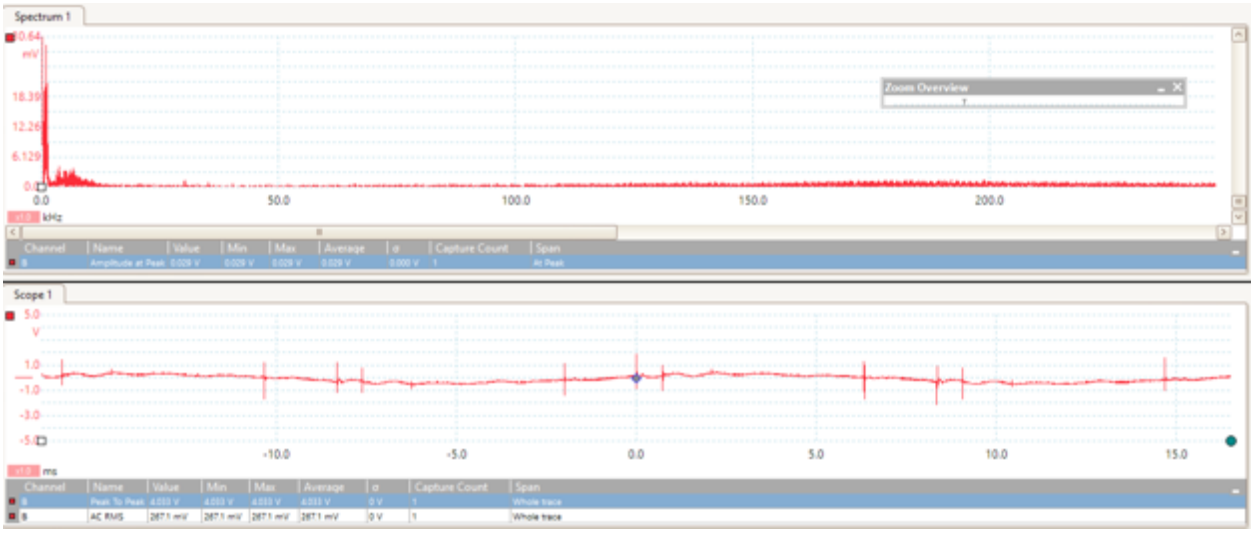
Mechanical Room Ground/Neutral - SineTamer filter



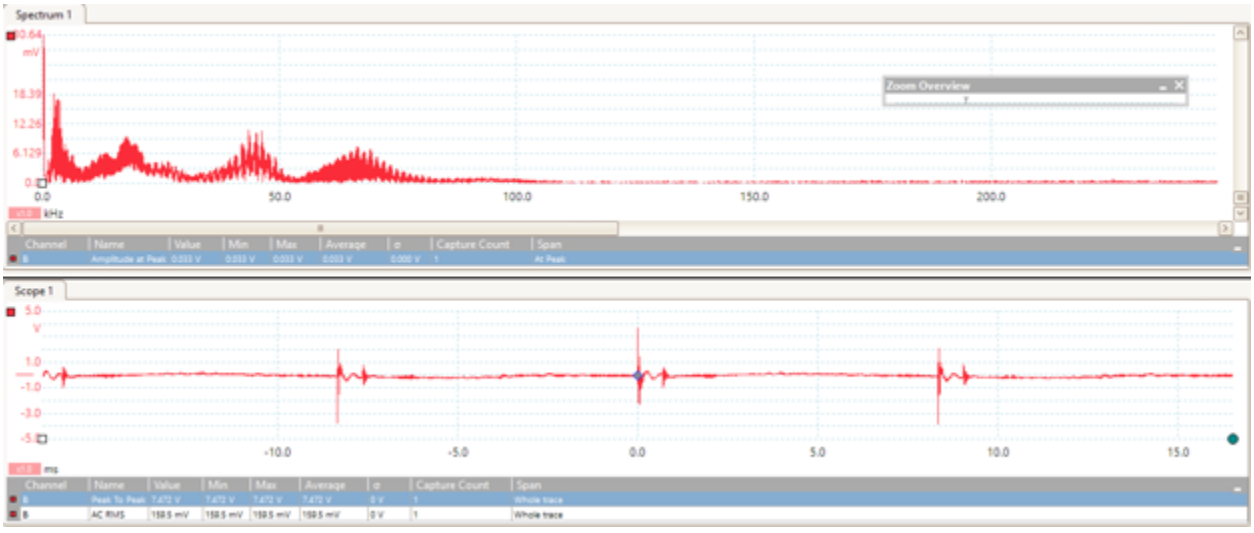
Master Bedroom Ground/Neutral - No filter



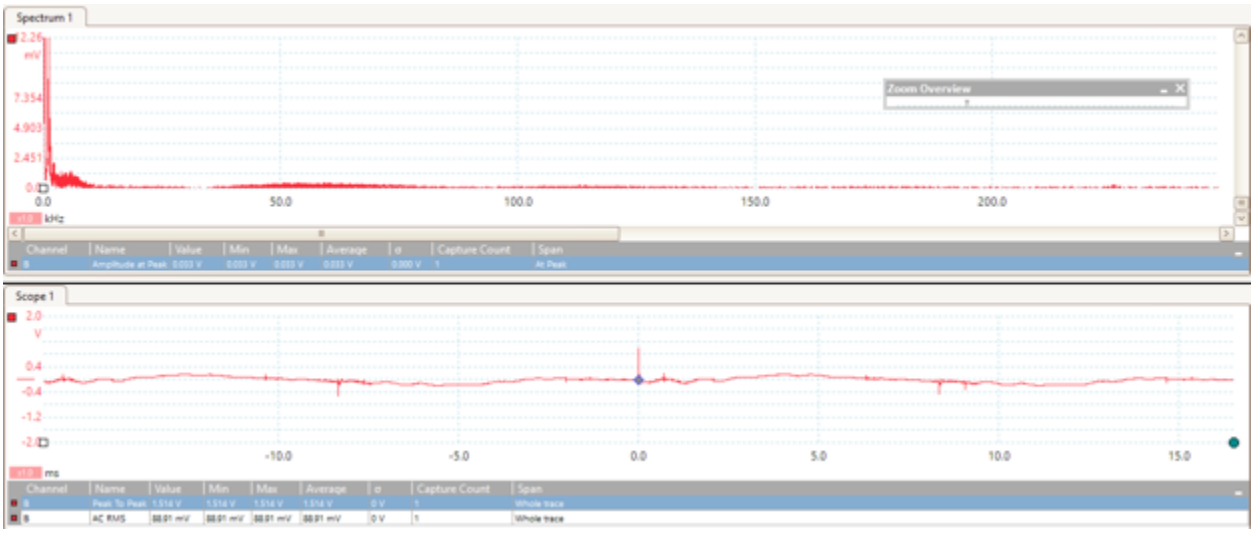
Master Bedroom Ground/Neutral - Greenwave filters



Master Bedroom Hot/Neutral - No filters



Master Bedroom Hot/Neutral – Greenwave filters



Another way to measure dirty electricity is with the Power Line Meter which measures high frequency electric fields present on your power lines in milliVolts Peak-to-Peak. It captures frequencies between 10 KHz and 10 MHz. This is in the extreme category. Most of the home was around 1500mV prior to installing all greenwave filters. Once all Greenwave filters were strategically placed the home dropped to around 50 mV!

RF/HF/Microwave Field Readings (microwatts per meter squared)
Caused by WIFI, cell towers, wireless devices at 27MHz – 10GHz

Any readings above 1000uW/m^2 are in the extreme concern for building biology standards.

Please note that due to the way the RF/HF wireless technology has changed there is a much wider bandwidth with high needle like peaks, therefore such signals require a "high crest factor added on". All of these readings can be given a multiplication factor of 10.

Main Areas of Concern

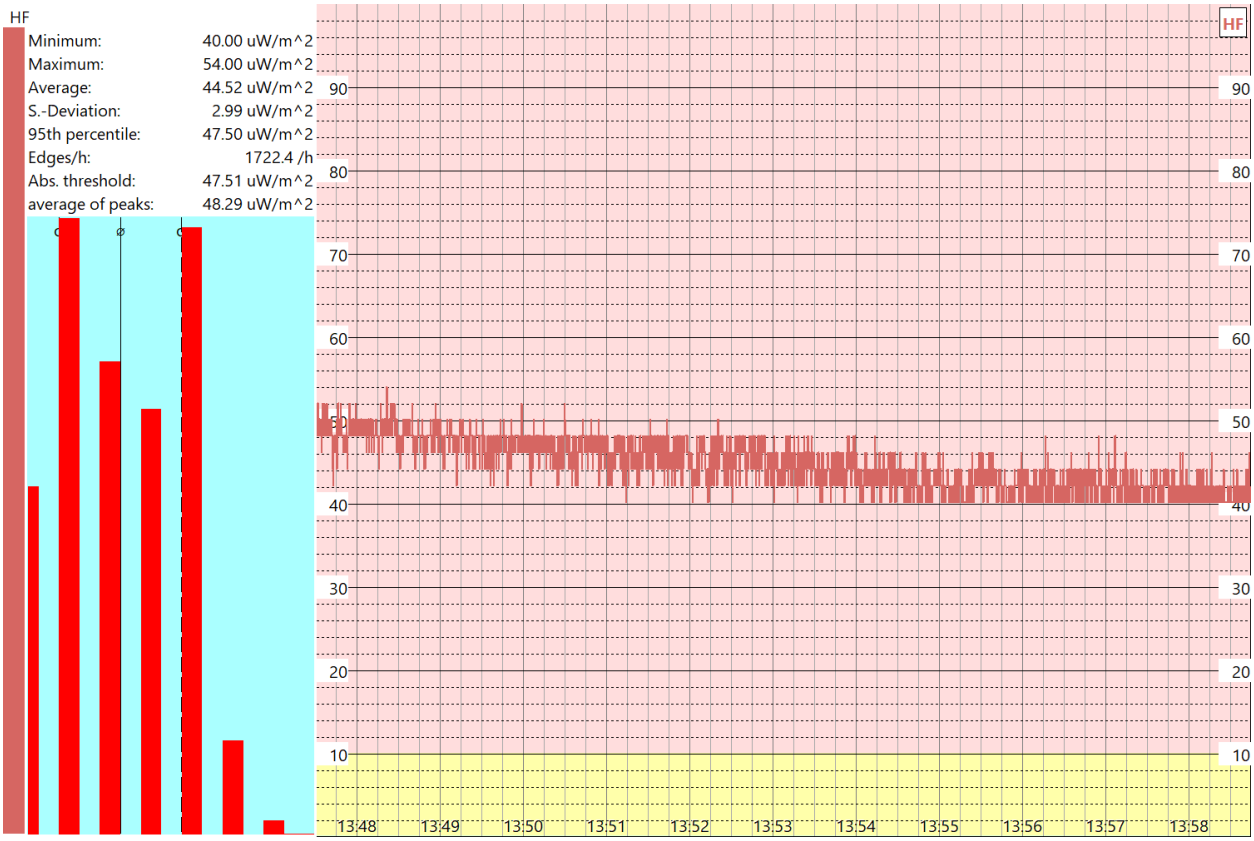
Bluetooth office soundbar from about 6 feet away was at ***1200uW/m^2***
Telus Wireless TV from 6 feet away was about **18*00uW/m^2***
Bluetooth speaker in living room pulses from 3 feet away was at ***150uW/m^2***
Laptops pulse from 2 feet away at about **17*00uW/m^2***
iPads pulses from 2 feet away at about **10*00uW/m^2***
Basement Office setup is from 6 feet away **30*00uW/m^2***
Cordless phone from about 4 feet away was at ***150uW/m^2***
Radar on the back deck was about **4*000uW/m^2***

Mitigation techniques are documented in the Executive Summary.

Examples of logged fields shown on the next few pages.

Master Bedroom

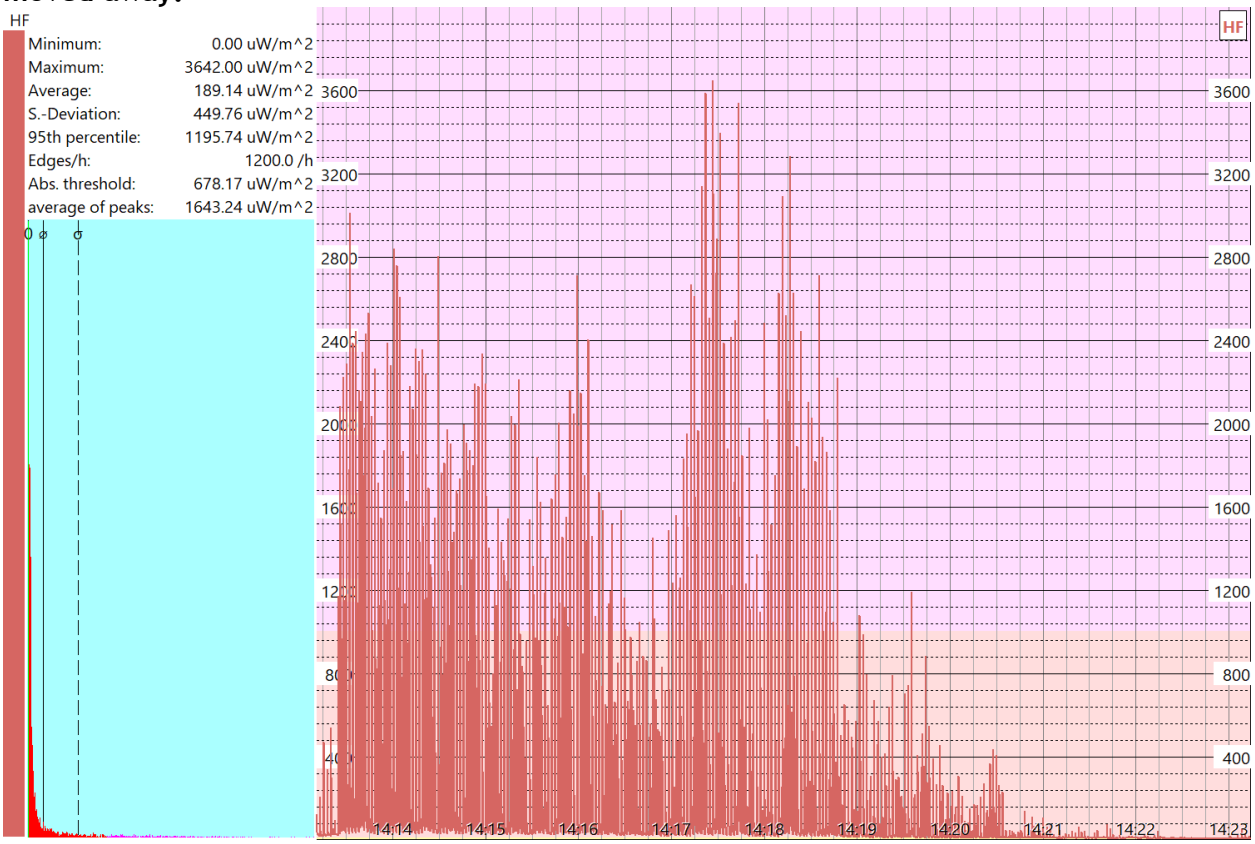
Below is a graph of the RF density in the bedroom with the WIFI on. The logarithmic antenna pointing at the south windows. What you are likely seeing are some nearby low frequency commercial towers.



High Crest factor reaches approximately 540uW/m²

Back Deck

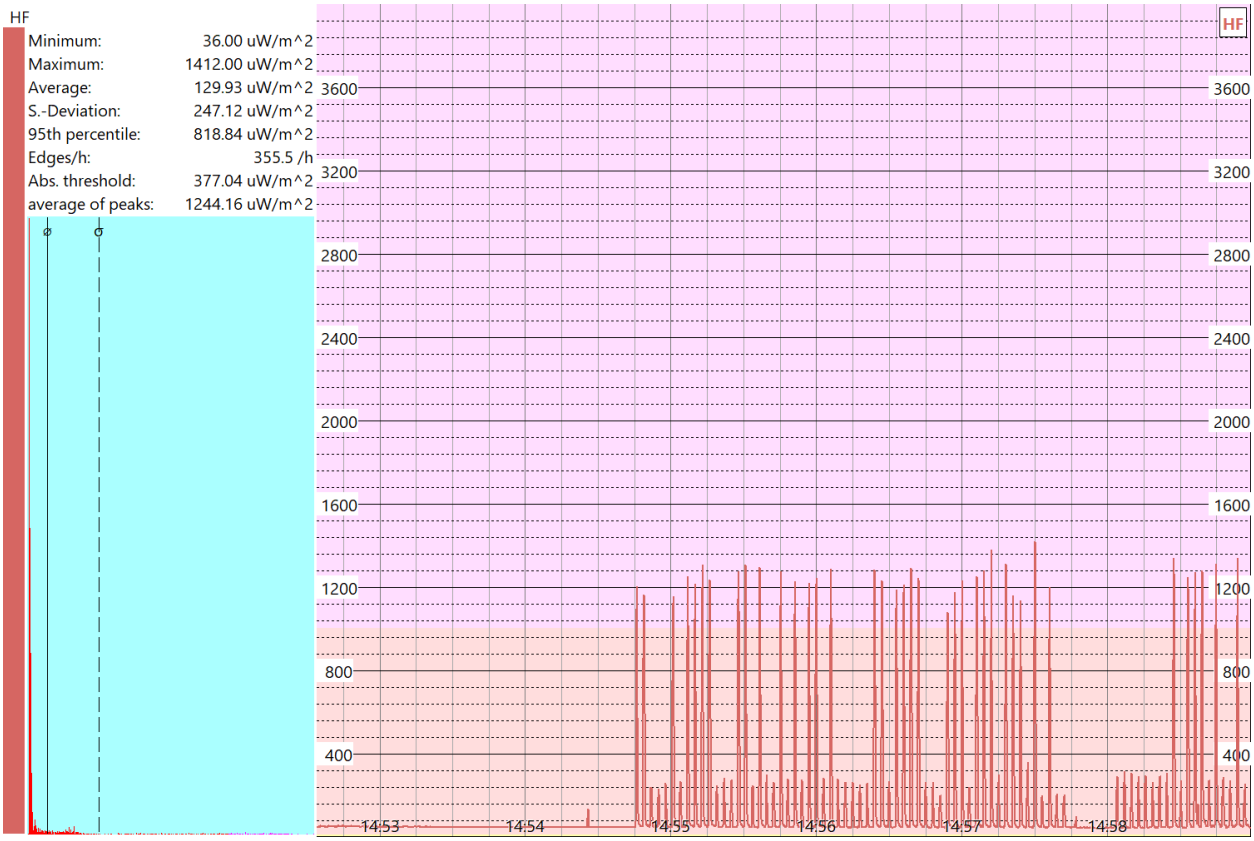
Below is a graph of the RF density on the deck. The logarithmic antenna pointing at highest signal which is south. It is in the extreme concern category. These are the pulses of radar from nearby ships and stations. It appears near the end of the log that the ships moved away.



High Crest factor is *30000W/m²*

Basement Office

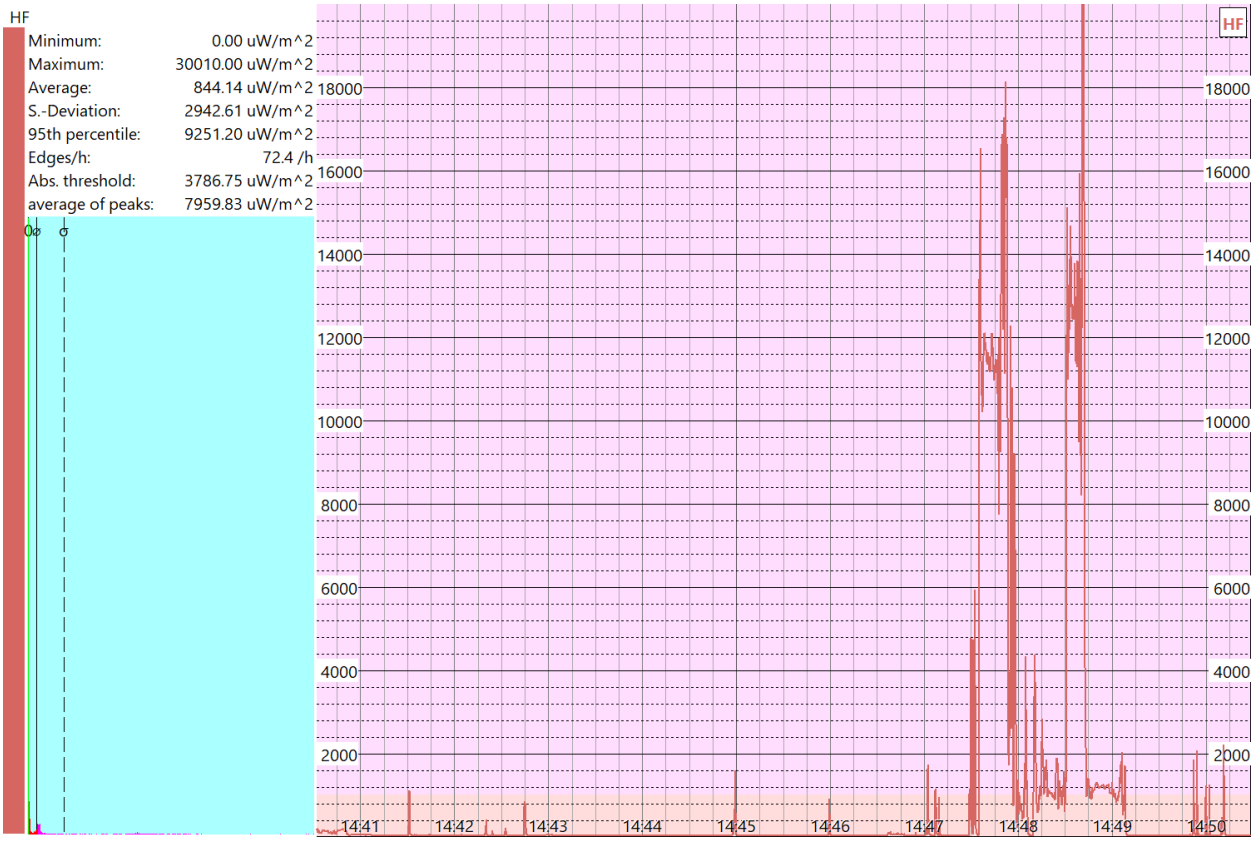
The graph shows the Bluetooth pulses of the sound bar under the Tv from about 6 feet away.



High Crest factor reaches approximately 12000uW/m²

Basement Office

The graph shows the Telus box and xbox turning on. They reach the extreme category

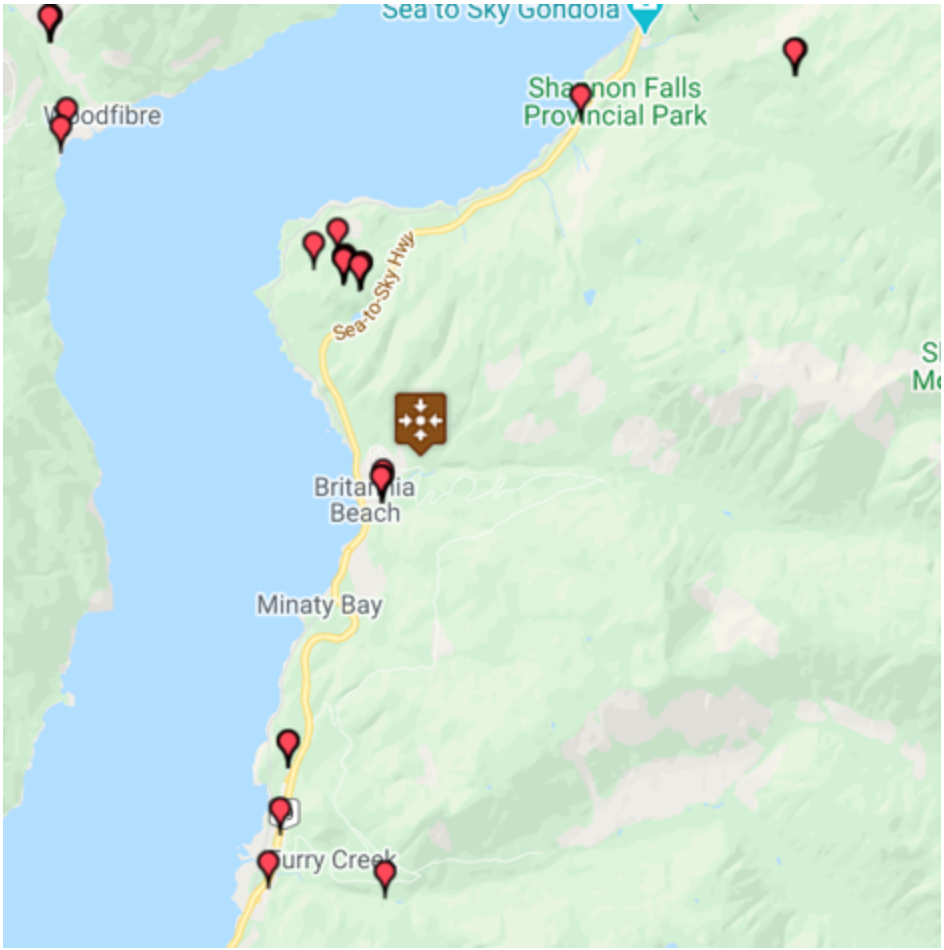


High Crest factor reaches approximately 300000uW/m²

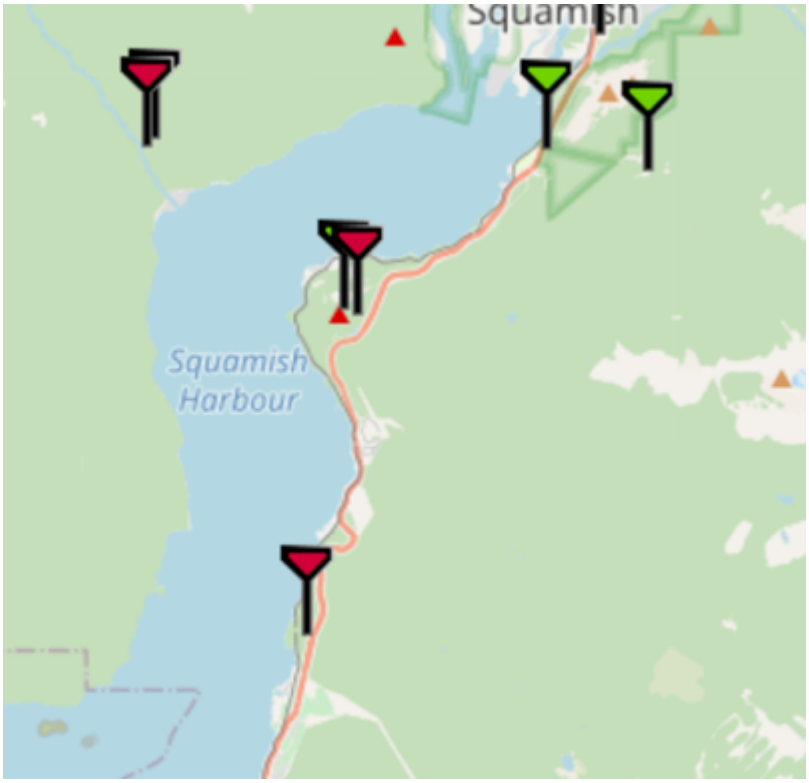
Nearby Communication/Cell Towers

This is map of most of the towers near you. The tower locations are the red dots. Most of the towers will be behind the mountain in relation to where you live. There are some low frequency towers near you that are very low powered. Further away there is a cell tower and a BC Hydro Wimax. Both have minimal impact. The telecom companies are currently setting up for 5G technology in Vancouver. It is highly unlikely your area will get anything for some time. Further below are more maps of some of the nearby cells and their frequencies. Some are private companies.

On the next few pages is a sample of some of the towers and cells near you and who controls them



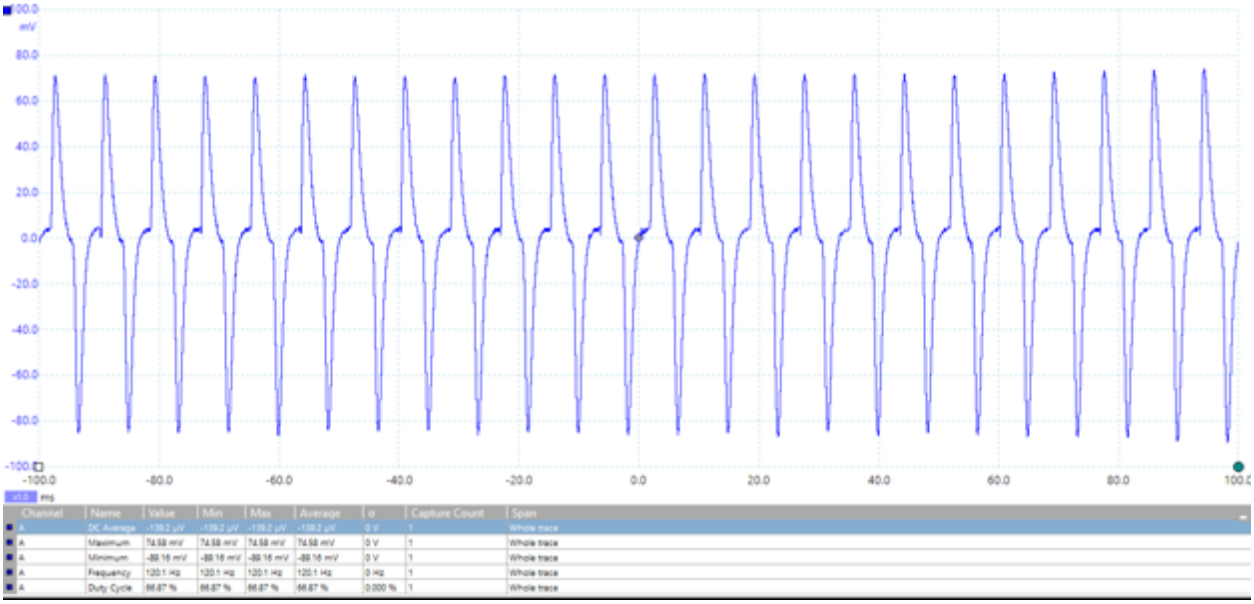
Here is a map of Telus (green), Rogers (red).



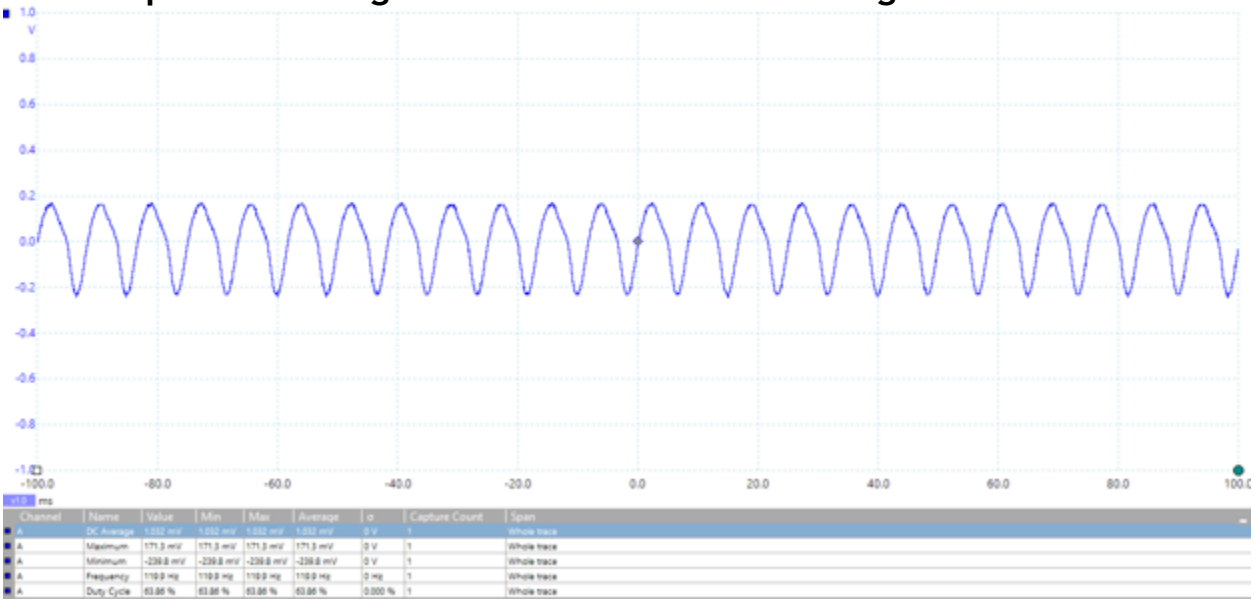
Below are all the towers that transmit above the capabilities of my equipment. It is a laser like frequency the transmits tower to tower for communication purposes. Usually this signal is far above the public.

Lighting Flicker Rate:

Your main overhead LED light flicker:



For comparison: A regular 60 watt Incandescent light flicker



The total report is 53 pages, of which on 32 are shown for the viewer. I trust this was informative.