Grateful Dowsing
Environmental Healing Services

Frank DiCristina BBEC, EMRS
Certified Building Biology Environmental Consultant & Certified ElectroMagnetic Radiation Specialist

EMF Assessment Report for Haller Residence @ at 7420 Rice Lake Road, Duluth, MN 55803 5/31-6/1/23

Preface: Our EMF testing and reporting is objective, informative and we are independent of industry and government. We detect and measure EMFs that others won't, due to policy, or can't, due lack of training or proper instruments and we show you the biologically precautionary and non-thermal risk levels reported in independently funded, peer reviewed reports. Solutions are suggested and ongoing assistance is available by working with solution providers and verifying reduction in EMF exposure.

This report compares the 2020 report with measurements taken in May/June of 2023 of the very same property, same locations, using identical meter and a spectrum analyzer (in 2020) with a USB connected laptop with the WIFI turned off for data logging and screen shots images of the scans (for this scan).

Limitations of this assessment and report

EMF assessments detect and measure electromagnetic fields and radiation in or around a building or house.

This is a confidential report and no personal information will be shared except with those working on the project unless permission is granted by those ordering the report.

This assessment and report are not a structural, mechanical, pest or building code inspection. All measurements are a one time "snap shot" and measurements may be different on other days, other times of the day, at other locations, measured with different instruments or instrument settings.

We can detect measure, assign a risk level, propose & effectuate solutions that will reduce measurable EMF exposure but can't guarantee that health symptoms will reduce or disappear.

We can't make any claims about the presence or absence of pollutants other than the specific issues we tested for and measurements within the limits of our equipment nor can we make assumptions about conditions in areas of the building that were not tested.

By acceptance of this report the client or other readers hereby release Frank DiCristina, Grateful Dowsing dba: Environmental Healing Services and any recommended solution providers from any and all liability

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Interpreting the Results

Building Biology Guidelines for Sleeping Areas

All of the EMF measurements taking in sleeping areas will be categorized as 1 of the following, depending on the levels detected.

No Concern: This category provides the highest degree of precaution. It reflects the unexposed natural conditions or the common and nearly inevitable background level of our modern living environment.

Slight Concern: As a precaution and especially with regard to sensitive and ill people, remediation should be carried out whenever possible.

Strong Concern: Values in this category are not acceptable from a building biology point of view, they call for action. Remediation should be carried out soon. In addition to numerous case histories, scientific studies indicate biological health effects and health problems within this reference range.

Extreme Concern: These values call for immediate and rigorous action. In this category international guidelines and recommendations for public and occupational exposures may be reached or even exceeded.
* If several sources of risk are identified within a single subcategory or for different subcategories, one should be more critical in the final assessment.

RADIOFREQUENCY / MICROWAVE EXPOSURE GUIDELINES (High Frequency Electromagnetic Waves)

1› BUILDING BIOLOGY PRECAUTIONARY GUIDELINES (SBM-2015) For Sleeping Areas*

Power density (Peak)	No Concern	Slight Concern	Severe Concern	Extreme Concern
microWatts per square meter µW/m²	< 0.1	0.1 - 10	10 - 1000	> 1000
microWatts per square cm µW/cm²	< 0.000,01	0.000,01 - 0.001	0.001 - 0.1	> 0.1
milliWatts per square meter mW/m²	<0.000,1	0.000,1 - 0.01	0.01 - 1	> 1
Signal strength				
Volts per meter V/m	< 0.006,14	0.006,14 – 0.061,4	0.061,4 – 0.614	> 0.614

2› BIOINITIATIVE REPORT PRECAUTIONARY GUIDELINES (Dec 31, 2012) Updated 2014-2020 www.bioinitiative.org

BioInitiative Working Group, Cindy Sage and David O. Carpenter, Editors. A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Radiation. Precautionary target level is **3 - 6 µW/m²** or **0.000,3 – 0.000,6 µW/cm²** (Peak)

3› CANADA AND UNITED STATES GOVERNMENT GUIDELINES (1999, 2009, 2019)

In Canada, guidelines for Radio Frequency Wave exposure lay under the jurisdiction of Health Canada. Safety code 6 was developed in 1999 and offers federal guidelines for safe RF exposure levels. These limits are in the range of **2,000,000 to 10,000,000 µW/m² or 200 to 1000 µW/cm² (Time Averaged)** and are based solely on the short term thermal effects or the heating of body tissue. Adverse biological effects have been documented at levels far below Safety Code 6 guidelines. No Canadian biological exposure guidelines exist for long term exposure to low level Radio Frequency Radiation. This also holds true for the USA and their FCC guidelines.

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1. **Suggested Solutions:**

1.1 Install metal roof and have it properly grounded. A metal roof can help with blocking and reflecting cell tower signal away from the interior of the home.

1.2 Use Y-Shield Paint for all the inside walls on the exterior portion of the house especially the walls facing the cell tower. Also paint the ceilings if a metal rood is not installed. The exterior doors should also be painted as well. Due to the proximity of the tower, 2 coats minimum of Y-Shield are recommended.

1.3 Apply Signal Protect® RF window film to all windows and sliding glass doors to the side of house facing tower. This should be immediately effective, though costly & laborious. Professional application highly recommended.

1.4 Sell house & move to location with less RF exposure if above steps are not installed. This solution but very costly and disruptive will eliminate the exposure they are experiencing currently. An EMF assessment before becoming committed to a new property is necessary.

2. **General Summary:**

2.1 I was contacted in 2020 to measure the client's property to determine if the cell tower adjacent to the property could be a cause of RF exposure to their home. Marcia Haller was very concerned that the signals broadcasted from the tower could be a cause of her medical condition. I advised the client and her husband that I am NOT medically trained and I am a technician whose job is to measure the electromagnetic spectrum and identity the potential causes and suggest solutions.

2.2 The readings taken in 2020 showed peaks of up to 18mW, 18X higher than the Building Biology Standard Extreme Limit. At that time, it was over a 3-hour period during the middle of the day. This time it was taken during 2 periods where we felt the readings would be as high or higher, in the evening on 5/31/23 and morning 6/1/23. At that time in 2020, the Haller's have not built their Faraday cage in their garage as off yet. So, no readings were taken of that area

2.3 I discussed various solutions with Jay Haller about what could be done. None of them were financially acceptable both in 2020 or 2023. We even discussed metal siding as an option with shielding in the walls.

2.4 The last bit of discussion was moving. Their biggest concern was "where to." They have lived on their property long before the cell tower was installed. They also feelt that if they did opt to move that it still would not be long before another cell tower or multiple towers would be installed nearby.

2.5 **Statement of Professional Opinion:**

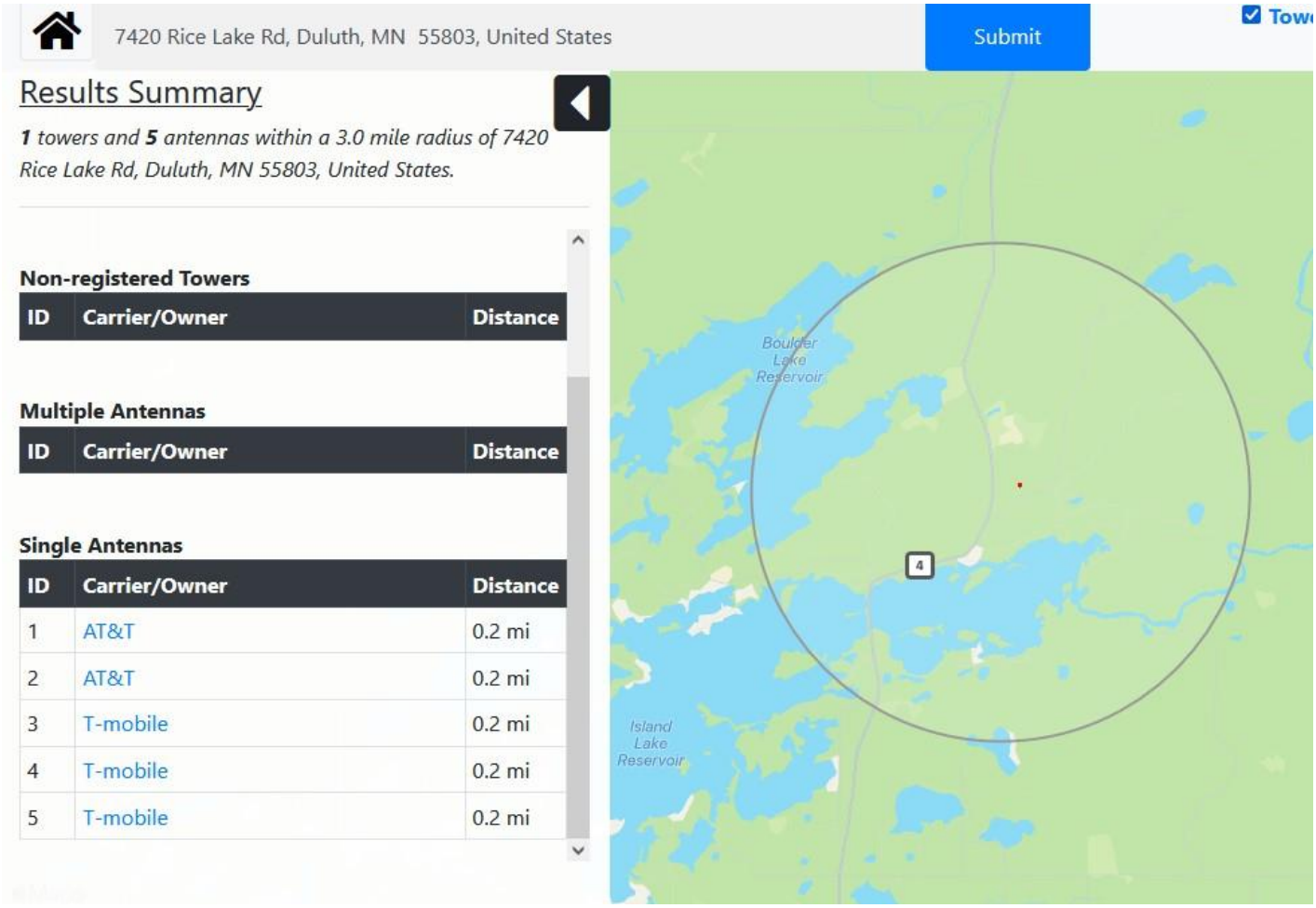
Due to legal reasons, I prefer not to recommend a client to move, but in this case that is in my opinion and the best solution. The Haller's could spend easily $30-60K or more in remodeling, renovating and mitigating their home but they would not be able to enjoy their whole property with the tower looming over their heads. The tower is less than ¼ mile away from their home and does not seem to be going anywhere or being shut down. I have been in the electronics industry as a technician in various capacities for over 40 years. I became certified as a Building Biologist in 2013, I have been the Program director for 2 years and also was an instructor for Advanced Electromagnetic Radiation seminars with the Building Biology Institute.

This home has severe to extreme exposure issues in the home and especially around the property. They have quite a few tall trees between the home and the tower, but due to tower height and distance I believe their exposure would be even worse if the trees were not present.

3. **Radio Frequency Radiation: RF 2023**

3.1 Sources:

AT&T, T Mobile 7397 Thompson Lake Road, Duluth, MN
(4) Neighbors WiFi



Sincerely,

Frank DiCristina BBEC, EMRS
Certified Building Biology Environmental Consultant & Certified ElectroMagnetic Radiation Specialist

Disclaimer

Though we hope the included recommendations will lead to a more productive, trouble free and healthier life, no statement or information provided by this report or linked to this website or subsequent consultation(s), is intended for use in the diagnosis, cure, mitigation, treatment or prevention of disease or any other medical condition. The reader, viewer or listener is advised to discuss the information provided here with an authorized healthcare practitioner.

We can detect measure, assign a risk level, propose & effectuate solutions that will reduce measurable EMF exposure but can't guarantee that health symptoms will reduce or disappear. Frank DiCristina Grateful Dowsing, shall not be liable for any health effects arising due to recommendations made or not made by the Assessment or subsequent consultation(s).

The measurements requiring physical connection to building wiring are conducted according to the best electrical practices. Grateful Dowsing is not responsible for any physical damage to electrical outlets or house power distribution system arising from loose, defective or brittle receptacles or improper wiring. The results relate only to the items tested.

The discussions in this report are based only on single (one time) results and may not be repeatable if conditions at the home, site or building change or if the results are collected during different time periods, at different locations, with different meters or meter settings.

Most of the inspection techniques, testing protocols and environmental criteria evaluated in this report were developed by the International Institute for Building Biology and Ecology, https://buildingbiologyinstitute.org/, based on established practices in Germany. We use top of line certified and calibrated instruments specifically designed for Building Biologists.

While relatively holistic in nature, these protocols can't cover every possible equipment or health hazard on any given property. There may be hidden hazards that were not exposed or tested for in this assessment. We can't make any claims about the presence or absence of pollutants or toxins other than what we tested for this report.

Next pages:

- **Photos & Data logs**
- **Meters used on this assessment**
- **Certifications, Bio and background of Frank DiCristina**

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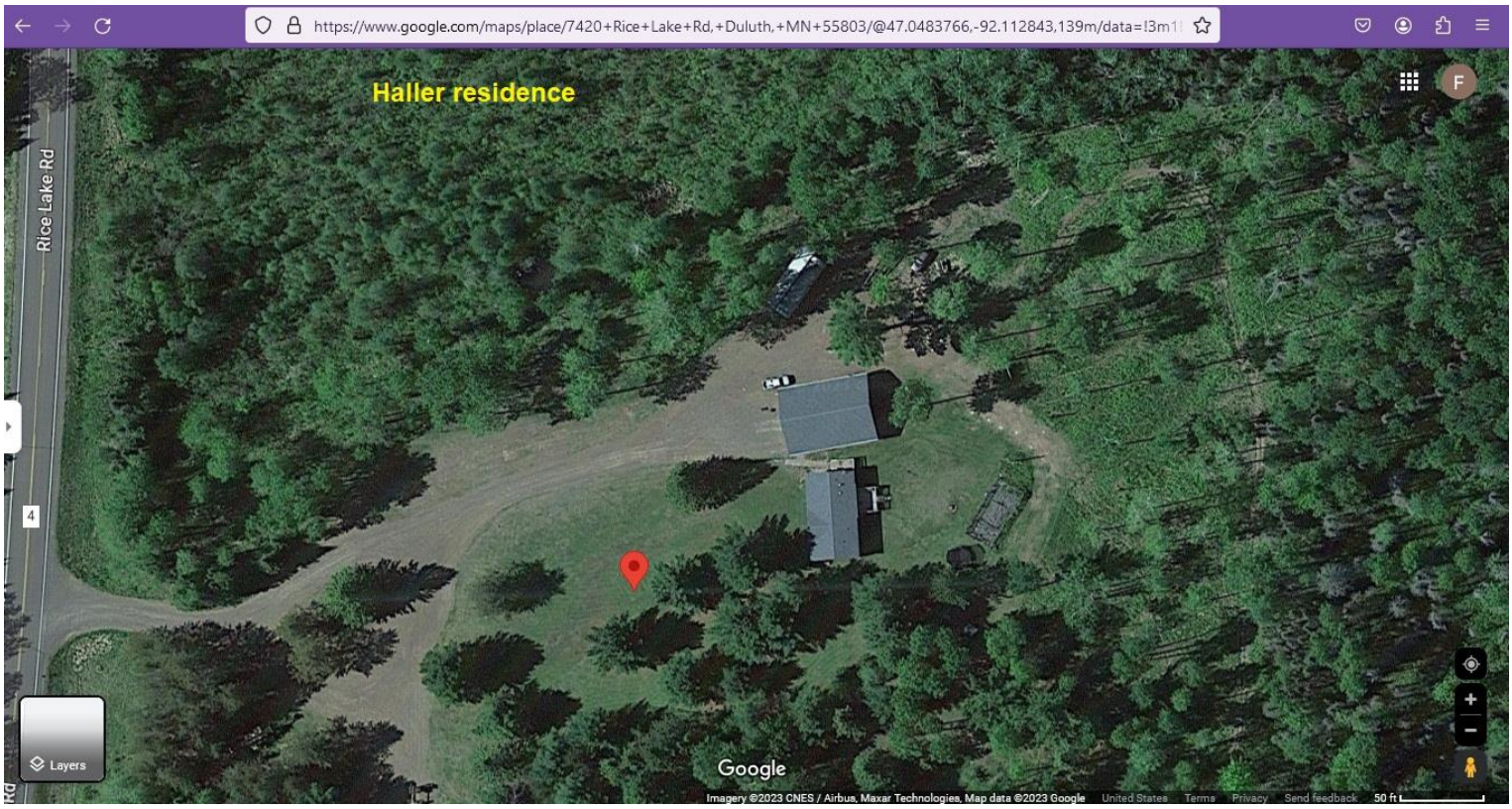

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And now in 2022, with 5G in so many places and the 5G race heating up, you need to know about carrier **low-band 5G**, **mid-band 5G**, **C-Band 5G**, and **mmW 5G**. Because not all 5G is created equal, confirming a phone has the best 5G coverage in your city is important.

So since there doesn't seem to be a quick reference guide for figuring out if a particular unlocked phone will work on a specific carrier's network (trust me, I've looked), we decided to throw one together.

Verizon, AT&T, T-Mobile, and Sprint network bands

Below, we have given you a quick chart that shows each of the four major US carriers (**Verizon, AT&T, T-Mobile, and Sprint**), along with 3G, 4G LTE, and 5G bands and frequencies. By no means is this the most in-depth wireless carrier band and frequency chart, but it should help when you go to buy that next unlocked phone from Samsung, Google, OnePlus, Apple, or Motorola.

US 5G Bands (by carrier)

CARRIER	BANDS	FREQUENCIES
AT&T	n5, n77, n260	850MHz (low), 3.7GHz (mid), 39GHz (mmW)
VERIZON	n2, n5, n77, n66, n261, n260	1900MHz (low), 850MHz (low), 3.7GHz (mid), 1700-2100MHz (low), 28GHz (mmW), 39GHz (mmW)
T-MOBILE	n41, n71, n261, n260	2.5GHz (mid), 600MHz (low), 28GHz (mmW), 39GHz (mmW)
SPRINT	n41	2.5GHz (mid)

US 4G LTE Bands (by carrier)

CARRIER	4G LTE BANDS	4G LTE FREQUENCIES
AT&T	2, 4, 5, 12, 14, 17, 29, 30, 66	1900, 1700/2100, 850, 700, 2300
VERIZON	2, 4, 5, 13, 66	1900, 1700/2100, 850, 700
T-MOBILE	2, 4, 12, 66, 71	1900, 1700/2100, 700, 600

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US 3G Bands (by carrier)

CARRIER	NETWORK	3G BANDS	3G FREQUENCIES
AT&T	GSM/HSPA+	2, 5	1900, 850
VERIZON	CDMA	0, 1	850, 1900
T-MOBILE	GSM/HSPA+	2, 4	1900, 1700/2100
SPRINT	CDMA	2, 10	1900, 800
US CELLULAR	CDMA	2, 5	850, 1900

UPDATED MARCH 1, 2022.

Straight Line Readings taken from Edge of clearing through area between house and garage out to the road.

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Location All measurements taken at approximately chest level	Date/Time	HF59B Peak setting UBB27 Antenna	Building Biology Precautionary Guidline	HF59B Average Setting UBB27 Antenna	Building Biology Precautionary Guidline	
		mW/m^2 no concern <0.000,1 Slight 0.000,1-0.01 Severe 0.01-1 Extreme >1	SMB-2015 Sleeping areas Extreme Concern Level	mW/m^2 no concern <0.000,1 Slight 0.000,1-0.01 Severe 0.01-1 Extreme >1	SMB-2015 Sleeping areas Extreme Concern Level	
	5/31/2023					
start	7:40pm					
Edge of Clearing		1.12mW	Extreme	.16mW	Severe	
20ft		1.1mW	Extreme	.36mW	Severe	
40'		1.9mW	Extreme	.36mW	Severe	
60'		1.07mW	Extreme	.50mW	Severe	
80'		1.55mW	Extreme	.34mW	Severe	
100'		1.28mW	Extreme	.29mW	Severe	
120'		1.51mW	Extreme	.38mW	Severe	
140'		.78mW	Severe	.19mW	Severe	
140'		1.11mW	Extreme	.28mW	Severe	
160'		.19mW	Severe	.05mW	Severe	
180'		.13mW	Severe	.08mW	Severe	
200'		.08mW	Severe	.04mW	Severe	
220'		.08mW	Severe	.04mW	Severe	
240'		.26mW	Severe	.05mW	Severe	
260'		.06mW	Severe	.04mW	Severe	
280'		.21mW	Severe	.04mW	Severe	
300'		.25mW	Severe	.04mW	Severe	
320'		.24mW	Severe	.04mW	Severe	
340'		.30mW	Severe	.05mW	Severe	
360'		.24mW	Severe	.06mW	Severe	
380'		.28mW	Severe	.04mW	Severe	
400'		.35mW	Severe	.08mW	Severe	
420'		1.30mW	Extreme	.15mW	Severe	
440'		1.41mW	Extreme	.07mW	Severe	
460'		.31mW	Severe	.11mW	Severe	
480'		.28mW	Severe	.07mW	Severe	

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500'		.38mW	Severe	.10mW	Severe	
520'		.57mW	Severe	.12mW	Severe	
finish	8:30pm					

Location	**Date/Time**	**Trifield Peak**		**Trifield Average**	
		mW/m^2 **no concern <0.000,1 Slight 0.000,1-0.01 Severe 0.01-1 Extreme >1**	**SMB-2015 Sleeping areas Extreme Concern Level**	**mW/m^2** **no concern <0.000,1 Slight 0.000,1-0.01 Severe 0.01-1 Extreme >1**	**SMB-2015 Sleeping areas Extreme Concern Level**
	5/31/2023				
start	7:40pm				
Edge of Clearing		2.4mW	Extreme	.48mW	Severe
20ft		2.3mW	Extreme	.77mW	Severe
40'		.79mW	Severe	.38mW	Severe
60'		.93mW	Severe	.22mW	Severe
80'		.47mW	Severe	.13mW	Severe
100'		.85mW	Severe	.22mW	Severe
120'		1.2mW	Extreme	.47mW	Severe
140'		1.45mW	Extreme	.37mW	Severe
140'		1.1mW	Extreme	.33mW	Severe
160'		1.03mW	Extreme	.238mW	Severe
180'		1.1mW	Extreme	.226mW	Severe
200'		.99mW	Severe	.15mW	Severe
220'		.63mW	Severe	.21mW	Severe
240'		.41mW	Severe	.14mW	Severe
260'		.45mW	Severe	.11mW	Severe
280'		.08mW	Severe	.03mW	Severe
300'		.03mW	Severe	.017mW	Severe
320'		.049mW	Severe	.017mW	Severe
340'		.062mW	Severe	.021mW	Severe
360'		.08mW	Severe	.03mW	Severe
380'		.42mW	Severe	.097mW	Severe
400'		1.5mW	Extreme	.29mW	Severe
420'		1.5mW	Extreme	.38mW	Severe
440'		2.9mW	Extreme	.56mW	Severe

460'		2.3mW	Extreme	.45mW	Severe
480'		1.4mW	Extreme	.45mW	Severe
500'		3.1mW	Extreme	.75mW	Severe
520'		.55mW	Severe	.18mW	Severe
finish	8:30pm				

Location	Notes
	Jay Haller wrote the numbers while I took the readings
start	we walked from the edge of clearing out to the road
Edge of Clearing	in as straight of a line as possible
20ft	we used the HF59B 1st and then backtracted with the
40'	Trifield meter. It was difficult gathering the data due to
60'	the bugs at that time of the day.
80'	
100'	20' from house
120'	deck
140'	standing on the deck
140'	on sidewalk (dead spot)
160'	
180'	Fire pit
200'	tree (humming bird feeders)
220'	
240'	
260'	
280'	
300'	
320'	
340'	
360'	
380'	
400'	
420'	
440'	
460'	
480'	
500'	
520'	Main Road

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finish

RF Explorer Scan Readings taken at Edge of Clearing Setup Details:

A small wooden table setup with multi-mount stand holding HF59B and RF Explorer meters was used. The RF Explorer was connected by USB to Dell Laptop to view RF scans with analyzer software. Pictures were taken of setup. Wireless networks were observed in the area. The Hallers do not have a wireless network and my phone was turned off once the testing had begun. RF Explorer scans and HF59B scans were taken at the same time. The RF Explorer scans were data logged and screen shots taken while the HF59B were written down. The time stamp was logged by the RF Explorer.

Scans were made in bandwidths using the coarse setting. Some high resolution scans were taken but was abandoned due to time the scan took and limited bandwidth. I felt the main point of the spectrum analyzer was to determine what areas of frequencies/signals were being transmitted, whereas the HF59B takes readings of the overall spectrum.

The HF59B does both peak and average readings by its selector switch. Also after each reading of the HF59B I cleared its hold memory for the next scan. The RF Explorer data logs but only the peak readings were taken. This was due to the fact how long it took for each scan. This took approximately 3 minutes each time depending on how many data points were taken. Also after a scan was done, I had to setup the software for the next bandwidth to scan.

Another thing to look for when viewing the scan images is the density plot on the lower screen shot. Areas of yellow-orange-red are of a concern they show the density of the frequency at that area of the RF spectrum. So a lower amplitude signal can still be a potential issue due to its frequency of broadcasting meaning how many times it's repeated as opposed to its strength.

Since the software took 1,000's of data points I only focused on the higher numbers for this report. That is shown in the chart below.

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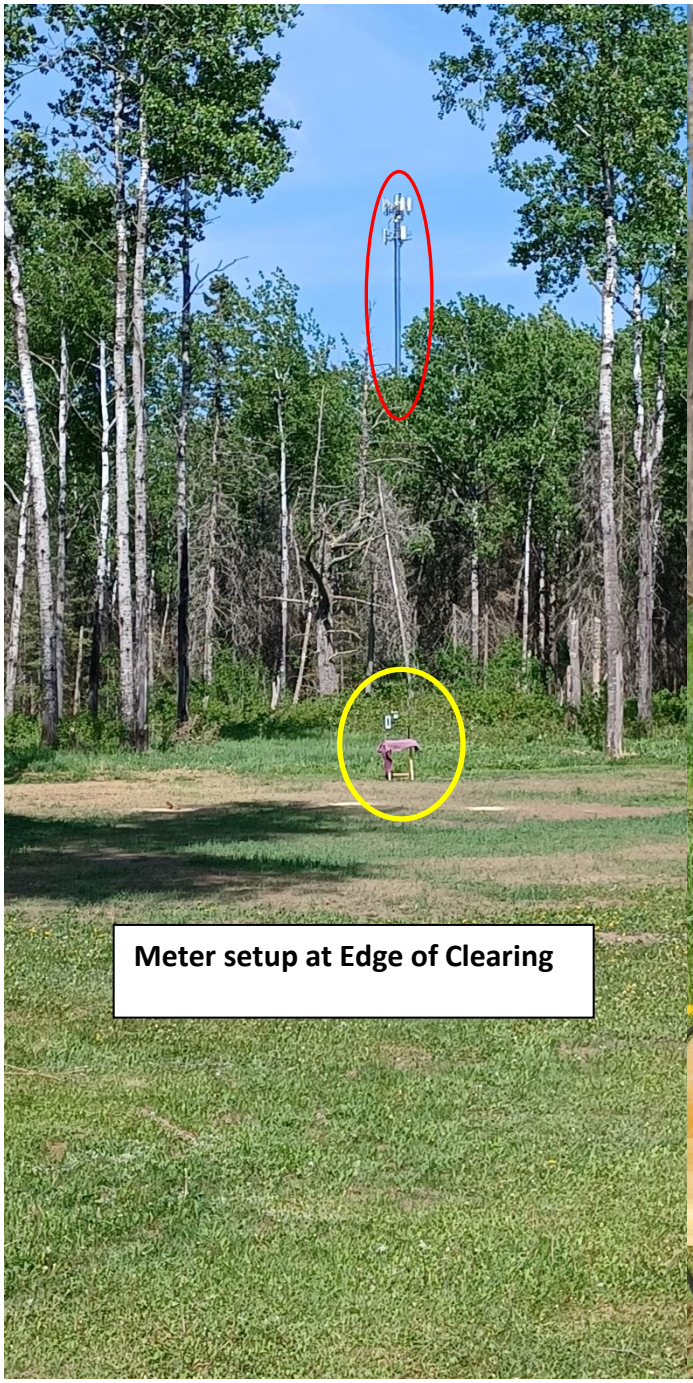

Meter setup at Edge of Clearing

Outdoor meter setup

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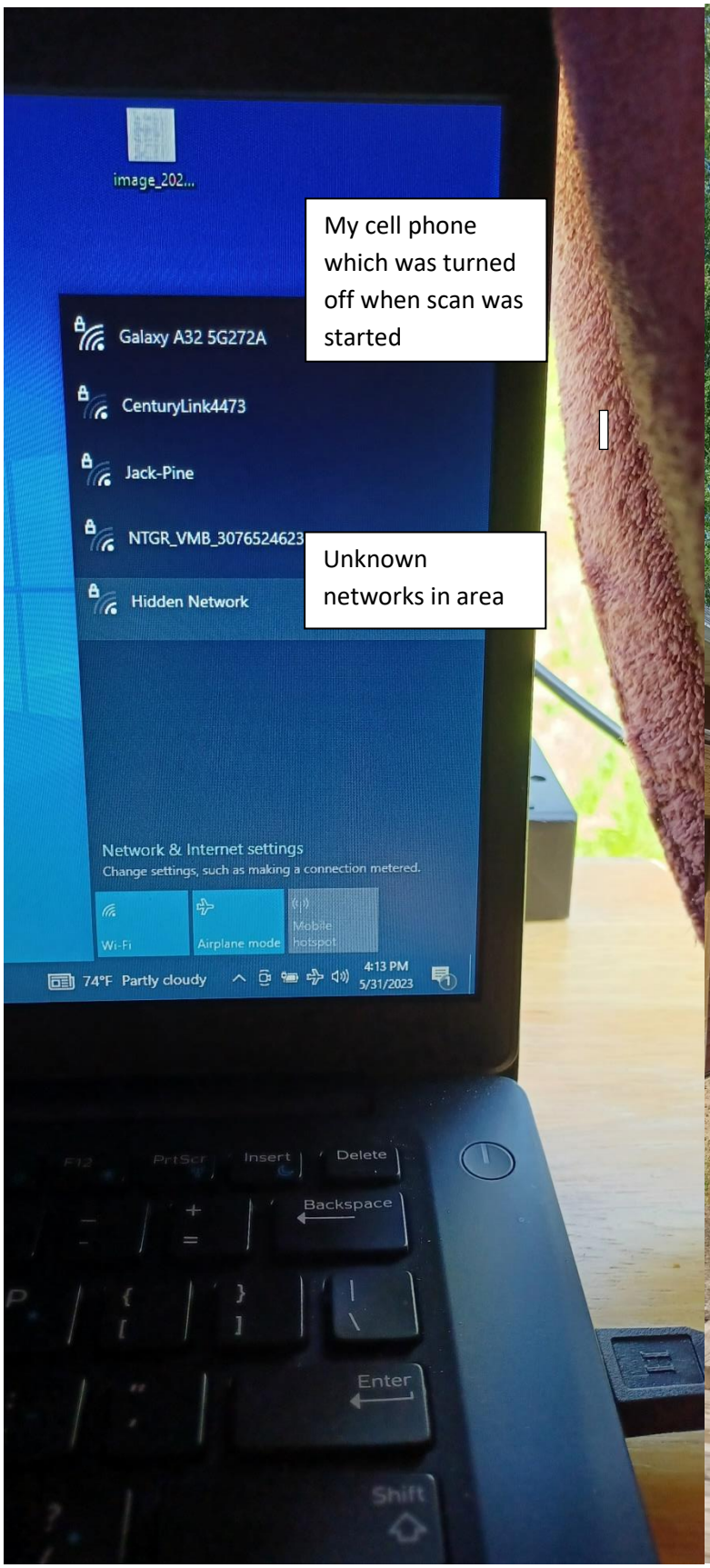

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OUTDOOR SCAN

Location	Date/Time	HF59B Peak	HF59B Average	Trifield Peak	Trifield Average	These readings were taken while setup was
Edge of Clearing	5/31/2023					taken at edge of clearing at 1st.
	4:25pm	9.93mW	.045-.88mW			
	4:32pm	3.95mW	.12-.37mW			
	4:45pm	7.28mW				
	5:01pm	2.22mW	.41-087mW			
	5:09pm	2.7mW	.46-.70mW			
	5:15pm	2.99mW	.67-.89mW			
	5:21pm	1.29mW	.21-.32mW			
	5:28pm	1.68mW	.16-.26mW			
	5:37pm	2.02mW	.019-.34mW			
Hot Spot in yard	6:27pm			3.39mW	.77mW	Marcia Haller brought out her Trifield meter
	6:30pm			4.30mW	.661mW	to show me hot spots in the yard
	6:33pm			4.87mW	1.551mW	

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Location All measurements taken at approximately chest level	Date/Time	HF59B Peak setting UBB27 Antenna	Building Biology Precautionary Guideline	HF59B Average Setting UBB27 Antenna	Building Biology Precautionary Guideline
		mW/m^2 no concern <0.000,1 Slight 0.000,1-0.01 Severe 0.01-1 Extreme >1	SMB-2015 Sleeping areas Extreme Concern Level	mW/m^2 no concern <0.000,1 Slight 0.000,1-0.01 Severe 0.01-1 Extreme >1	SMB-2015 Sleeping areas Extreme Concern Level
Edge of Clearing	5/31/2023				
	4:25pm	9.93mW	Extreme	.045-.88mW	Severe
	4:32pm	3.95mW	Extreme	.12-.37mW	Severe
	4:45pm	7.28mW	Extreme	NA	Severe
	5:01pm	2.22mW	Extreme	.41-087mW	Severe
	5:09pm	2.7mW	Extreme	.46-.70mW	Severe
	5:15pm	2.99mW	Extreme	.67-.89mW	Severe
	5:21pm	1.29mW	Extreme	.21-.32mW	Severe
	5:28pm	1.68mW	Extreme	.16-.26mW	Severe
	5:37pm	2.02mW	Extreme	.019-.34mW	Severe
		Trifield Peak		**Trifield Average**	
Hot Spot in yard	6:27pm	3.387mW	Extreme	.77mW	Severe
	6:30pm	4.30mW	Extreme	.661mW	Severe
	6:33pm	4.867mW	Extreme	1.551mW	Extreme

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RF EXPLORER OUTDOOR SCAN

5/31/2023	Peak					6/1/2023	Peak			
	Outdoor scan						Indoor scan			
Time PM	Frequency MHz	dbm	uW	Image		Time AM	Frequency MHz	dBm	uW	Image
4:30	494	-62	0.00063	17		9:27	584.77466	-73	0.00005	1 &2
	498	-62	0.00063	17			585.94583	-71	0.000079	1&2
4:42	625	-42	0.063095	18			587.117	-72	0.000063	1&2
	630	-40	0.1	18		9:40	627	-58	0.00158	3
	635	-38	0.158489	18			630	-58	0.00158	3
4:49	902.7027	-76	0.000025	19		9:42	758.753024	-71	0.000079	4
4:57	1348.6485	-70	0.00009	20			765.841425	-71	0.000079	4
5:05	1648.6485	-77	0.000019	21		9:54	989.1891	-86	0.0000025	5
5:11	1964.8647	-49	0.012589	22		9:57	1124.32425	-94	0.0000003	6
	1967.5674	-47	0.019952	22		9:59	1348.6485	-76	0.000025	7
	1970.2701	-47	0.019952	22		10:07	1348.6485	-76	0.000025	8
	1972.9728	-48	0.015848	22			1437.8376	-78	0.000015	8
5:17	2121.6216	-48	0.015848	23		10:19	1600	-82	0.000006	9
	2124.3243	-47	0.019952	23		10:24	1964.8647	-60	0.000999	10
	2127.027	-49	0.012589	23		10:41	2481.081	-56	0.002511	11
5:23	2480	-58	0.00158	24		10:52	4884.05402	-76	0.000025	12
5:31	4850	-69	0.000125	25		11:04	4935.1351	-70	0.00009	13
5:35	5005.4053	-59	0.00125	26		11:10	5205.4054	-71	0.000079	14
	5013.5134	-59	0.00125	26		11:15	5521.6216	-80	0.00001	15
	5024.3242	-59	0.00125	26			5586.4864	-80	0.00001	15
	5027.0269	-59	0.00125	26		11:23	6097.297	-69	0.000125	16
	5029.7296	-58	0.00158	26						
	5032.4323	-59	0.00125	26						
	5035.135	-59	0.00125	26						
	5037.8377	-56	0.002511	26						
	5040.5404	-57	0.00199	26						
	5043.2431	-58	0.00158	26						
	5051.3512	-58	0.00158	26						
	5054.0539	-57	0.00199	26						
5:40	5356.7566	-71	0.000079	27						
5:45	5510.8108	-77	0.000019	28						
	5513.5135	-77	0.000019	28						
	5578.3783	-78	0.000015	28						
5:59	6094.5943	-72	0.000063	29						
	6097.297	-69	0.000125	29						
	6099.9997	-71	0.000079	29						

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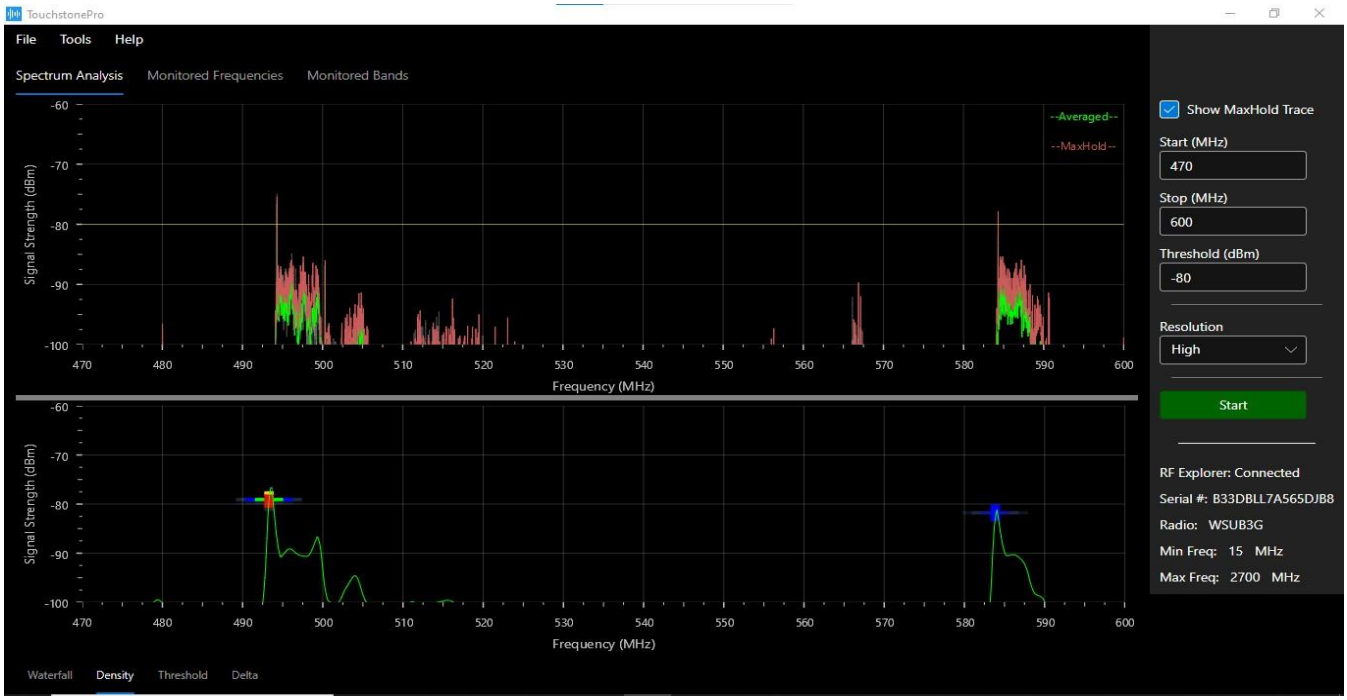
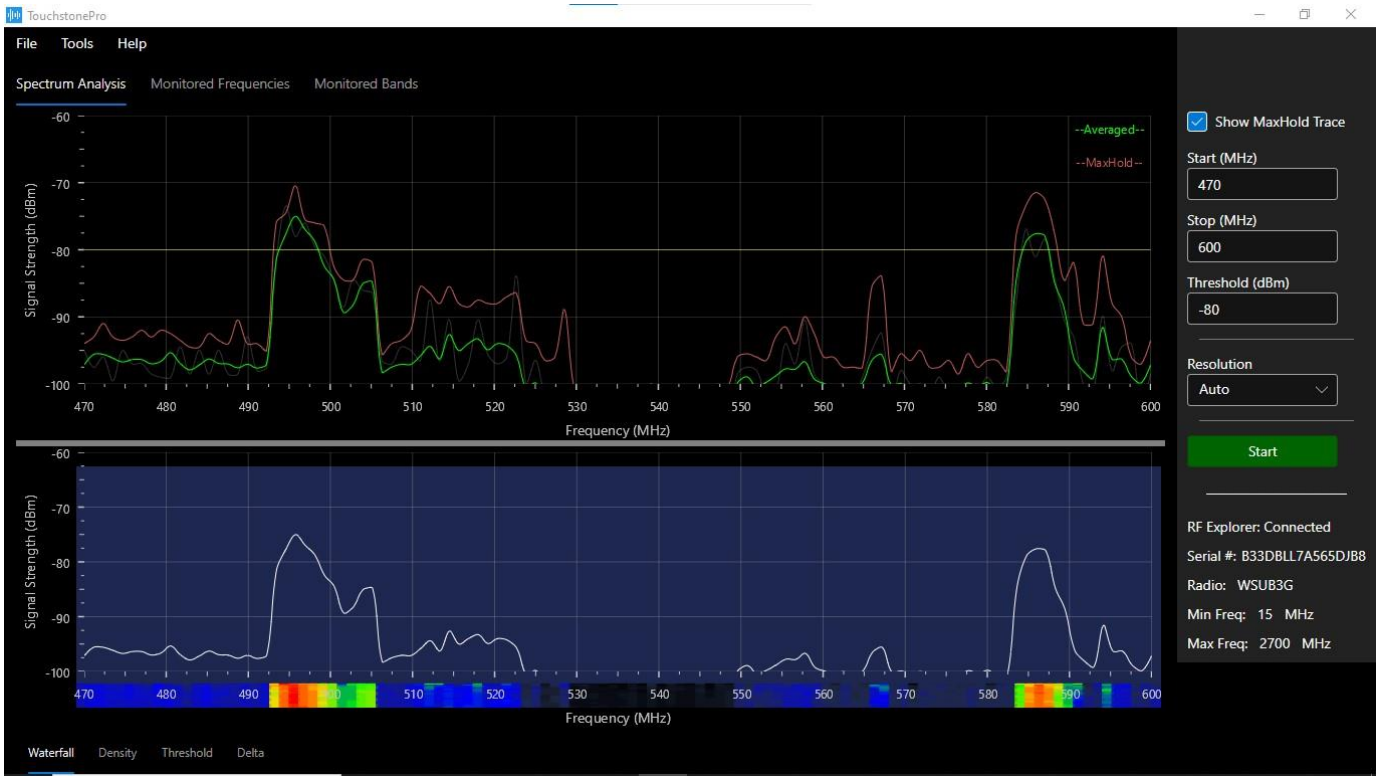
9:27am Image 1



9:27am Image 2



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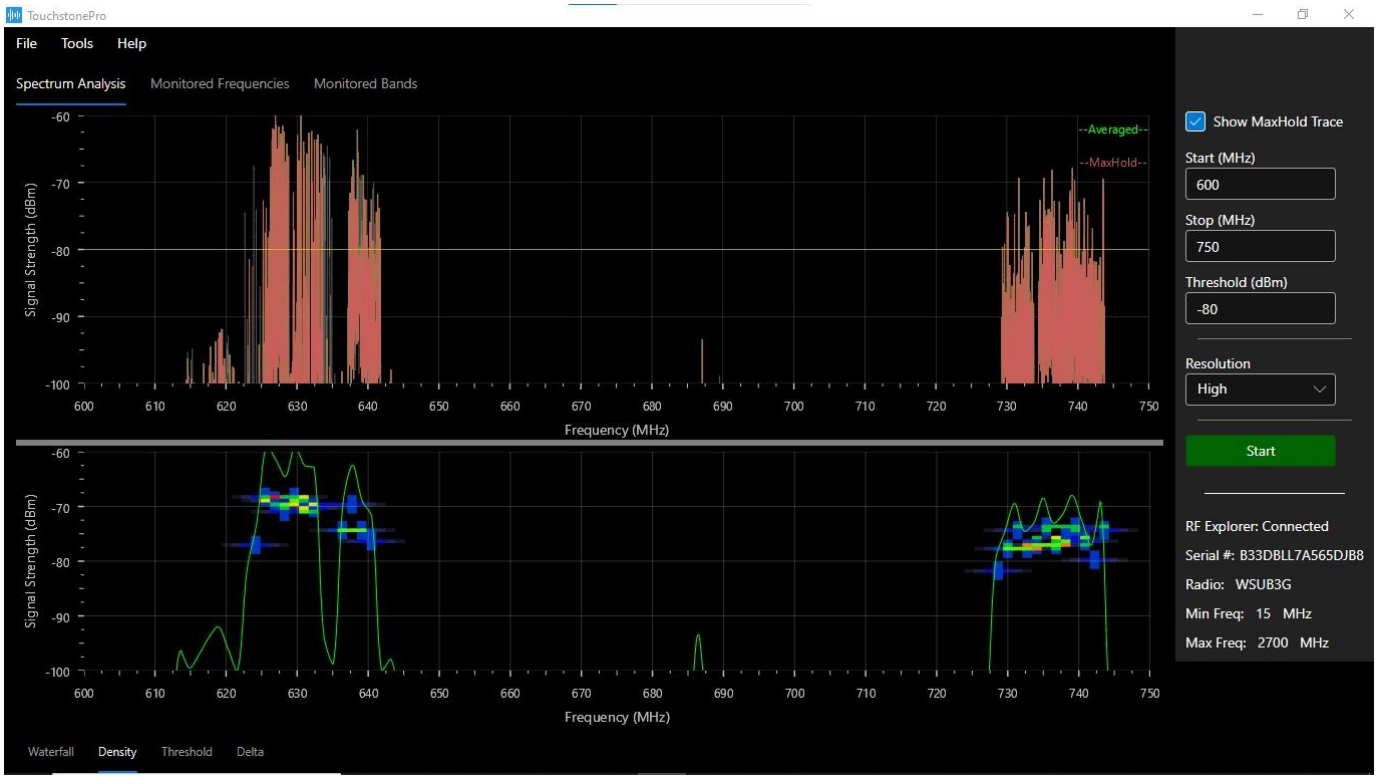
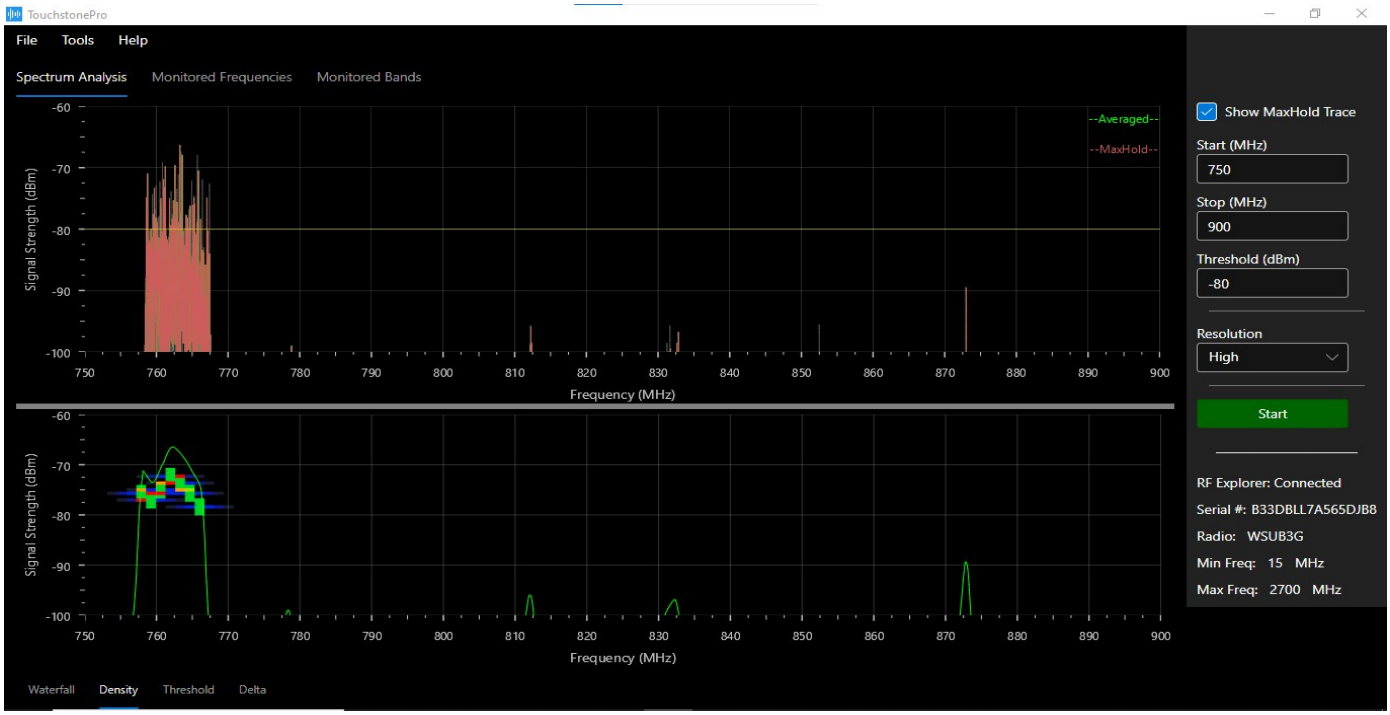
9:40am Image 3



9:42am Image 4



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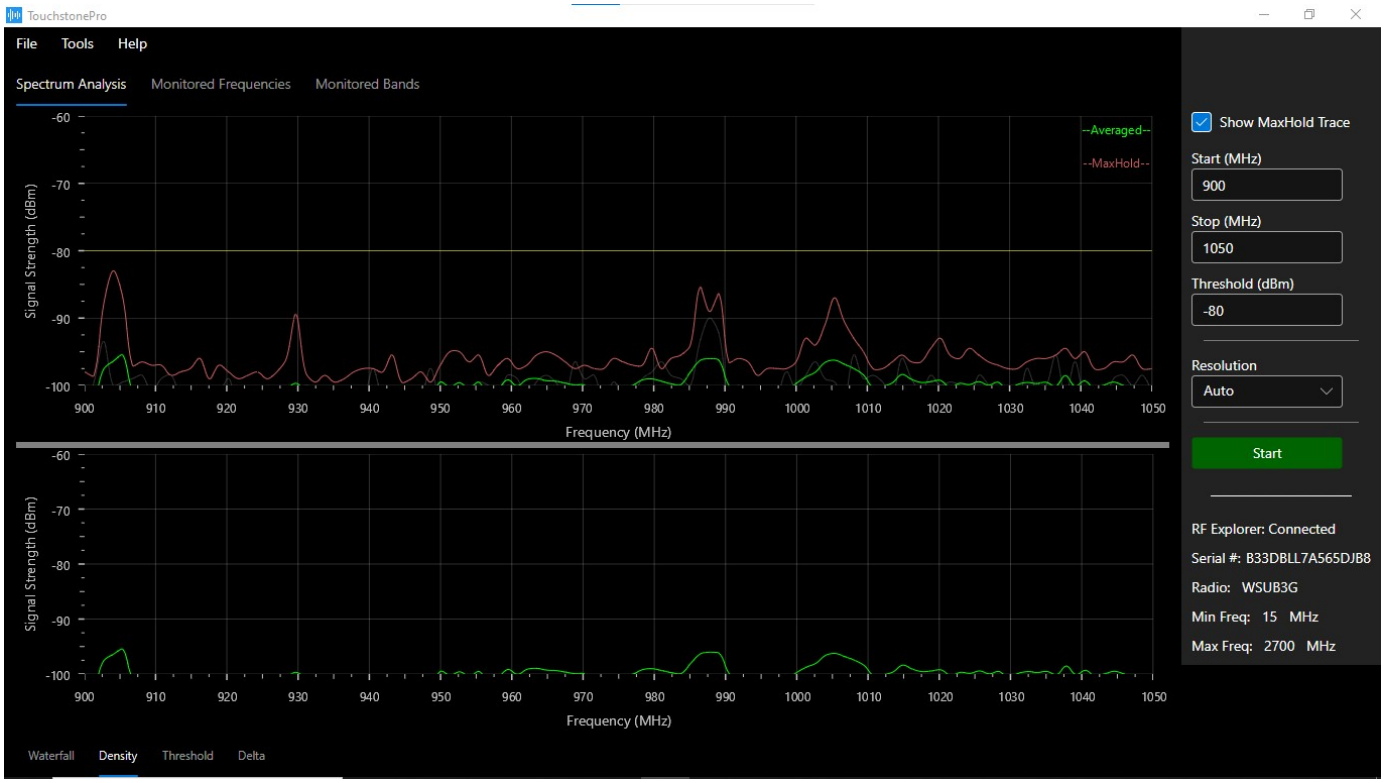
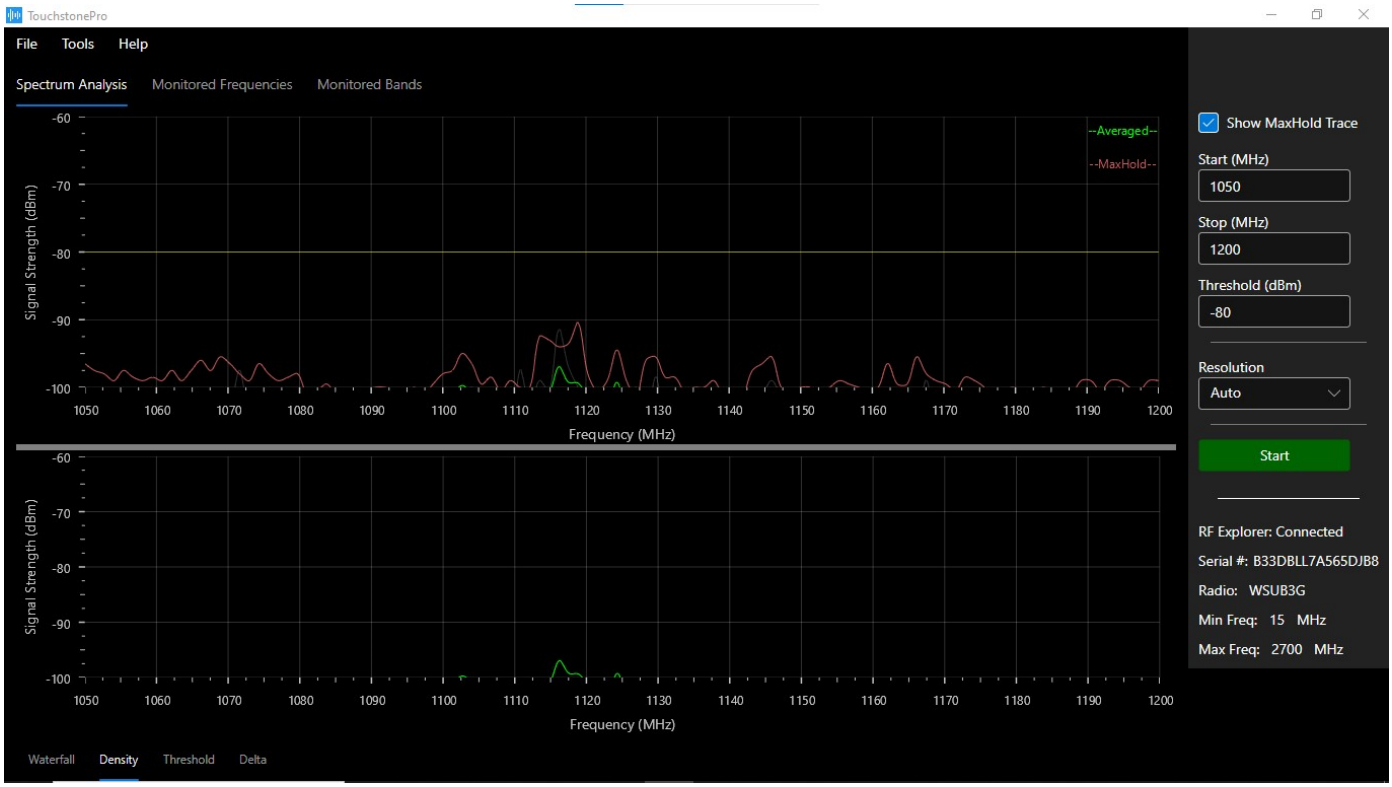
9:54am Image 5



9:57am Image 6



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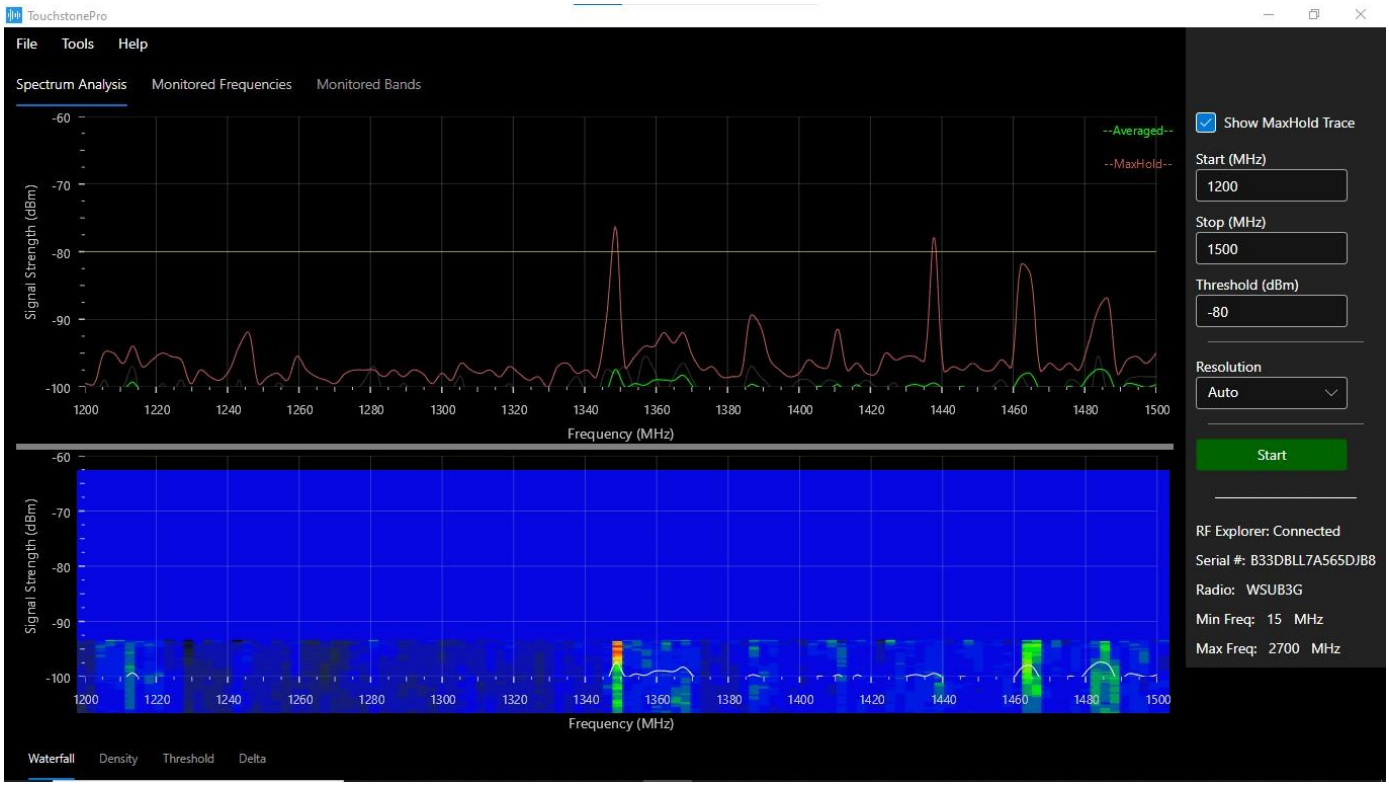
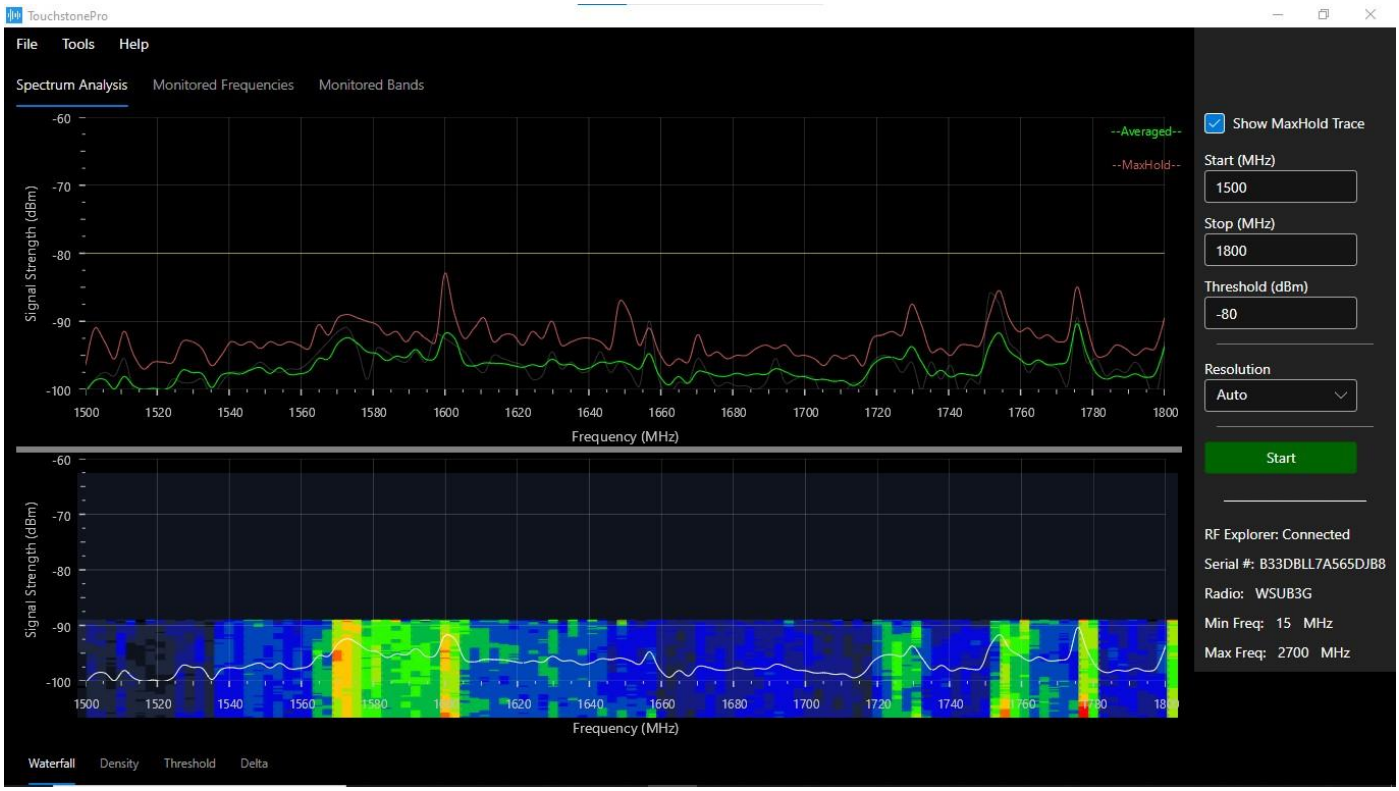
9:59am Image 7



10:07 am Image 8



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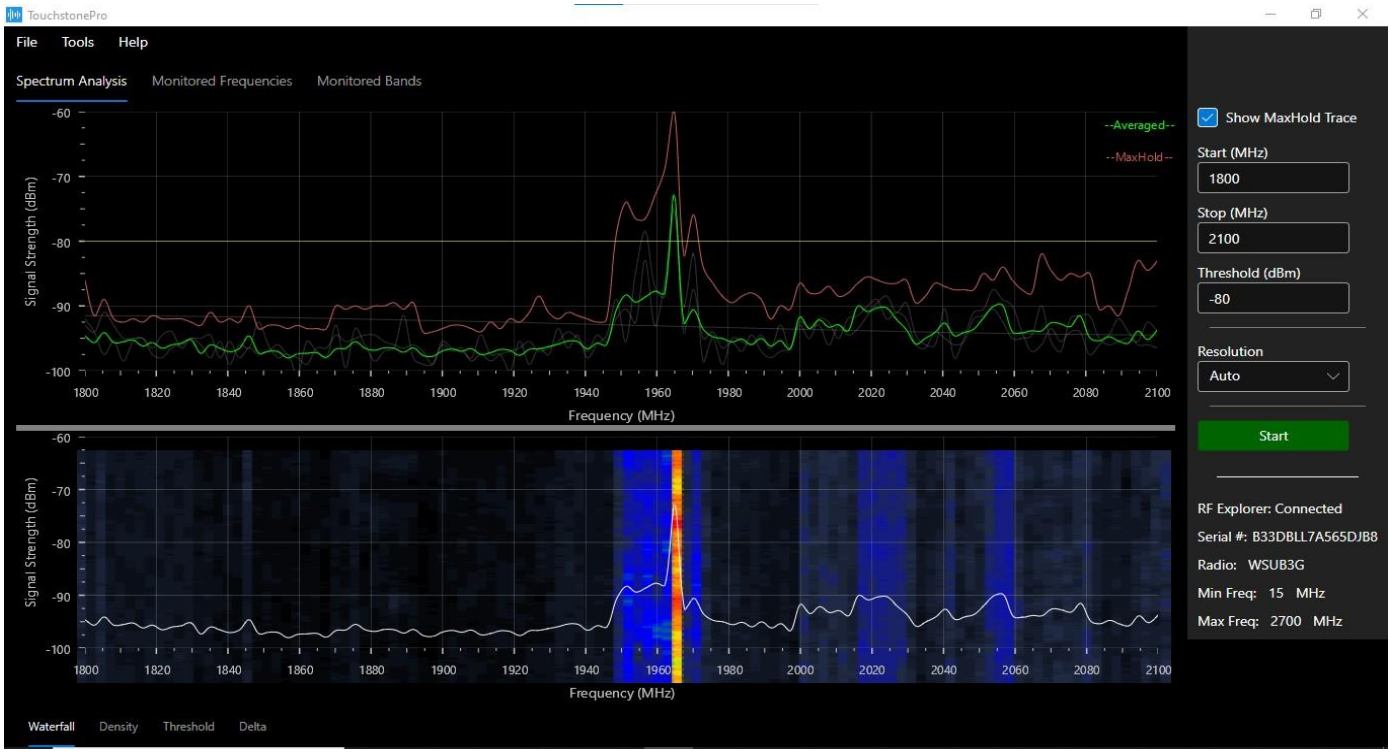
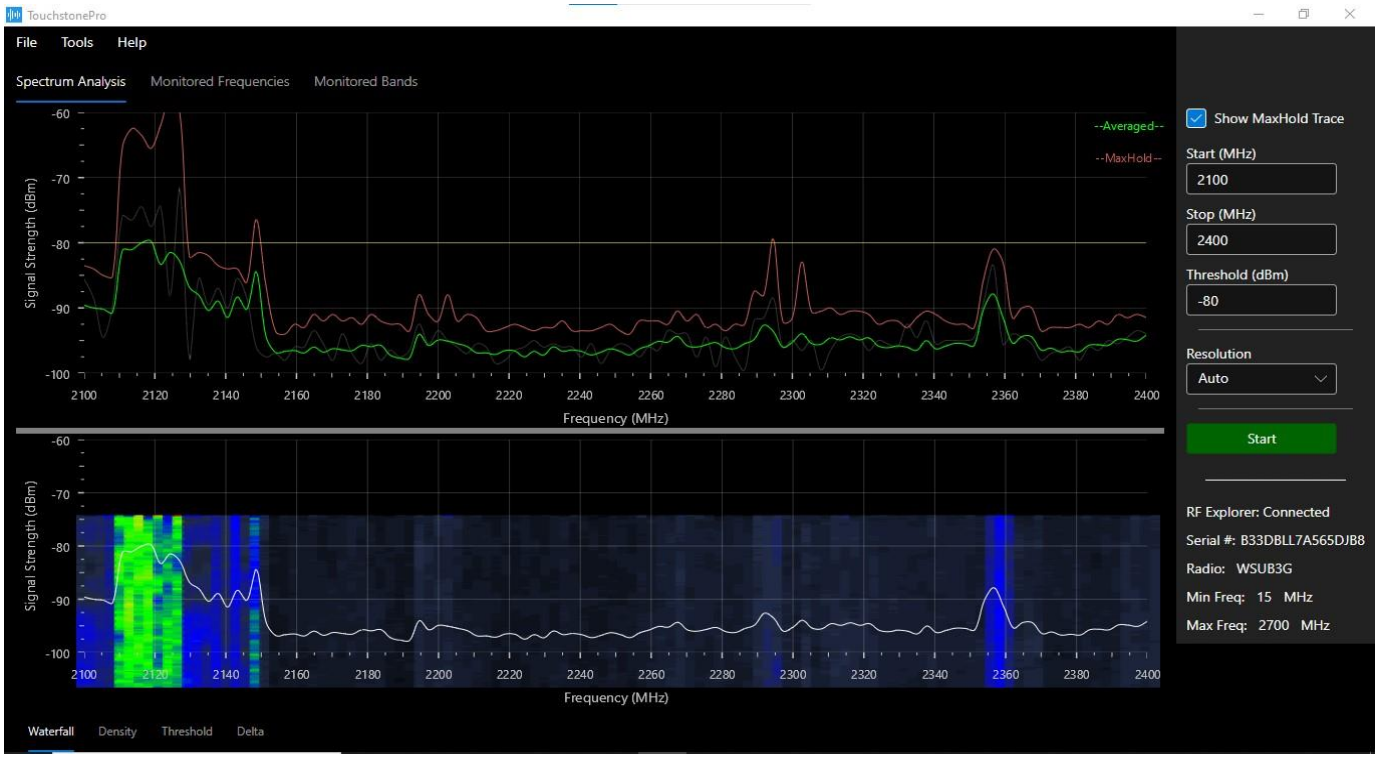
10:19am Image 9



10:24am Image 10



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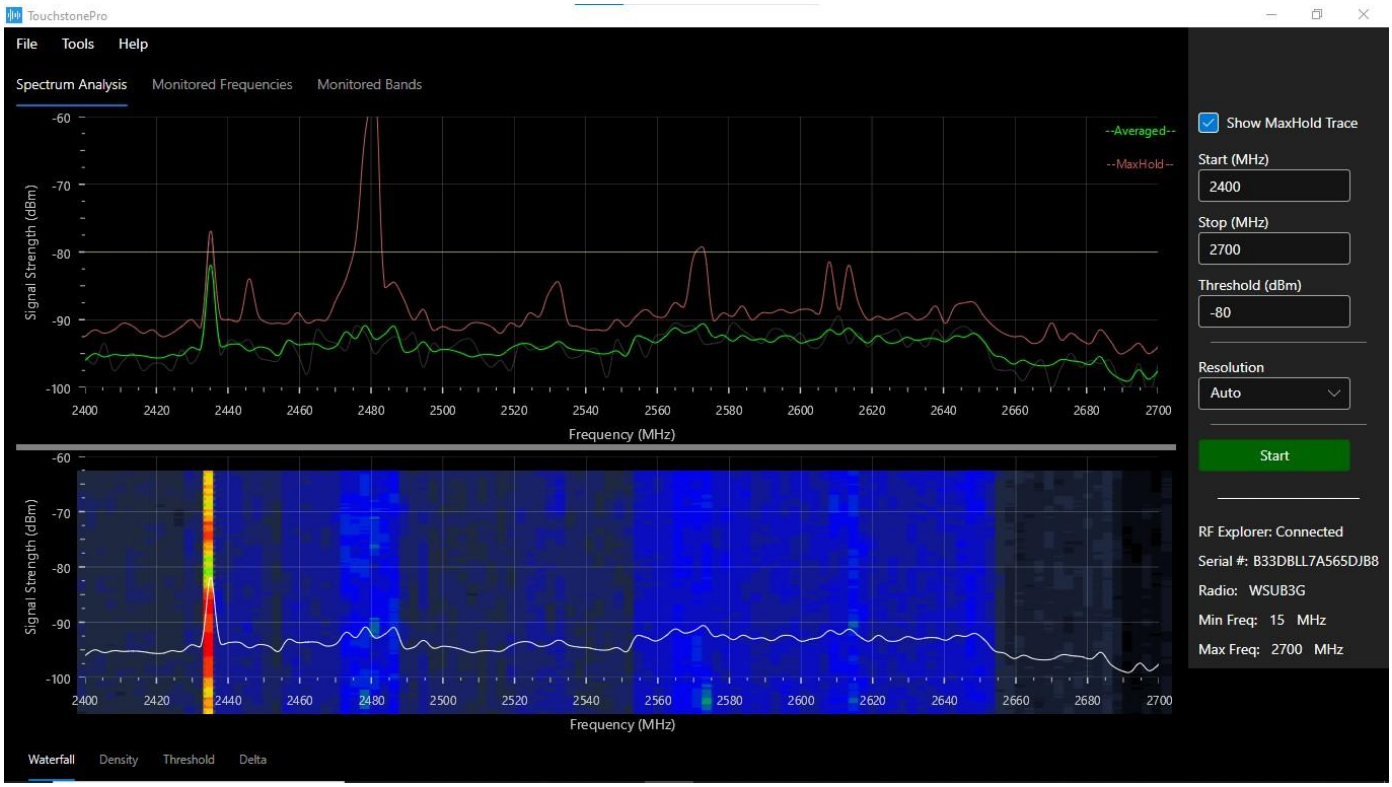
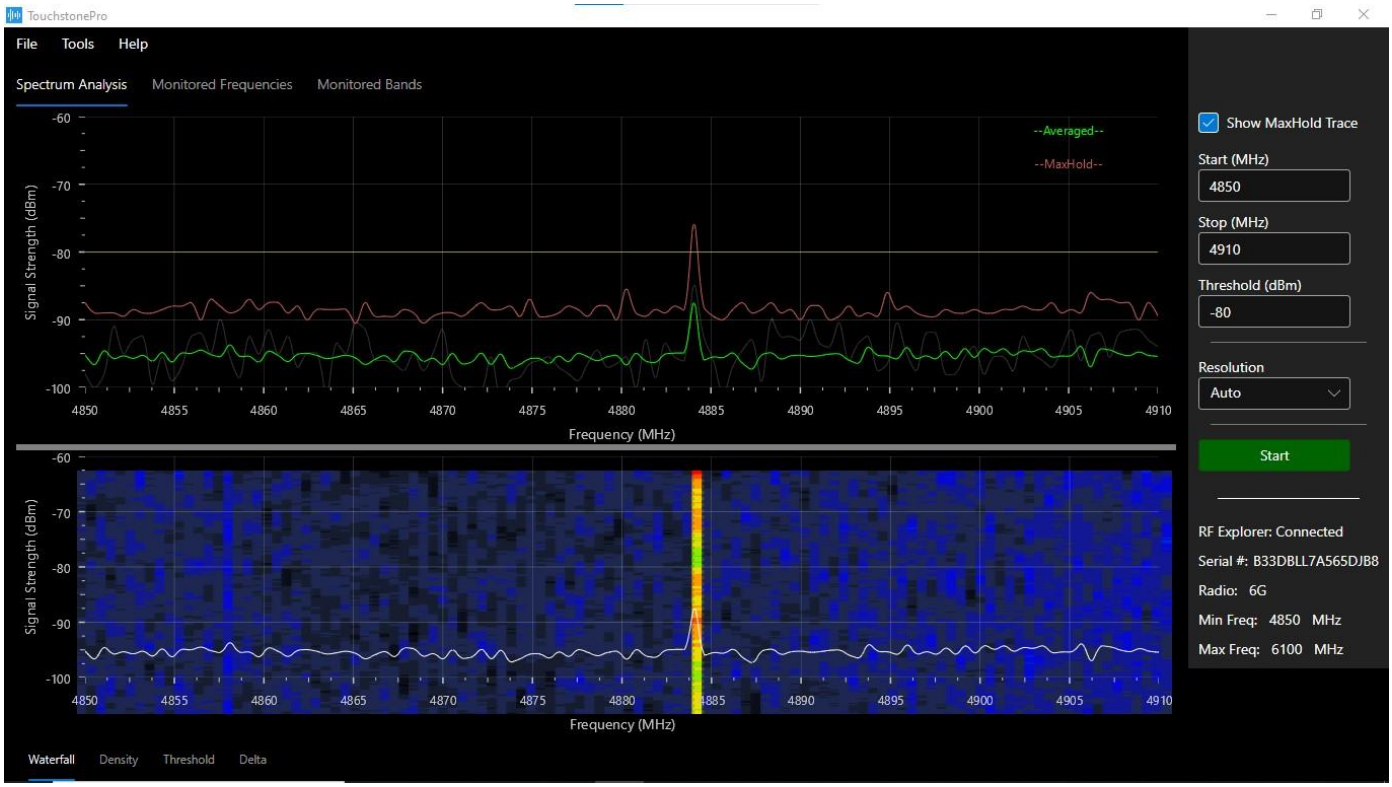
10:41am Image 11



10:52am Image 12



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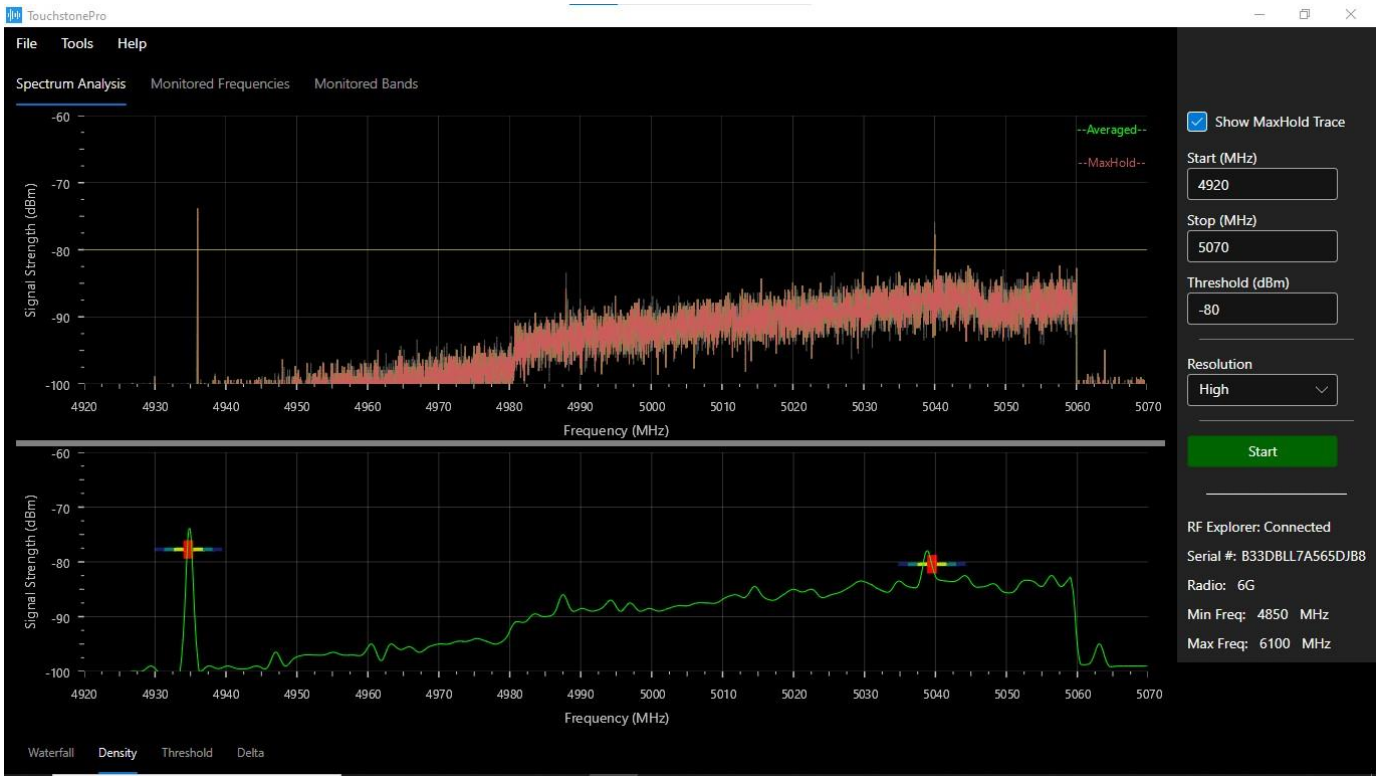
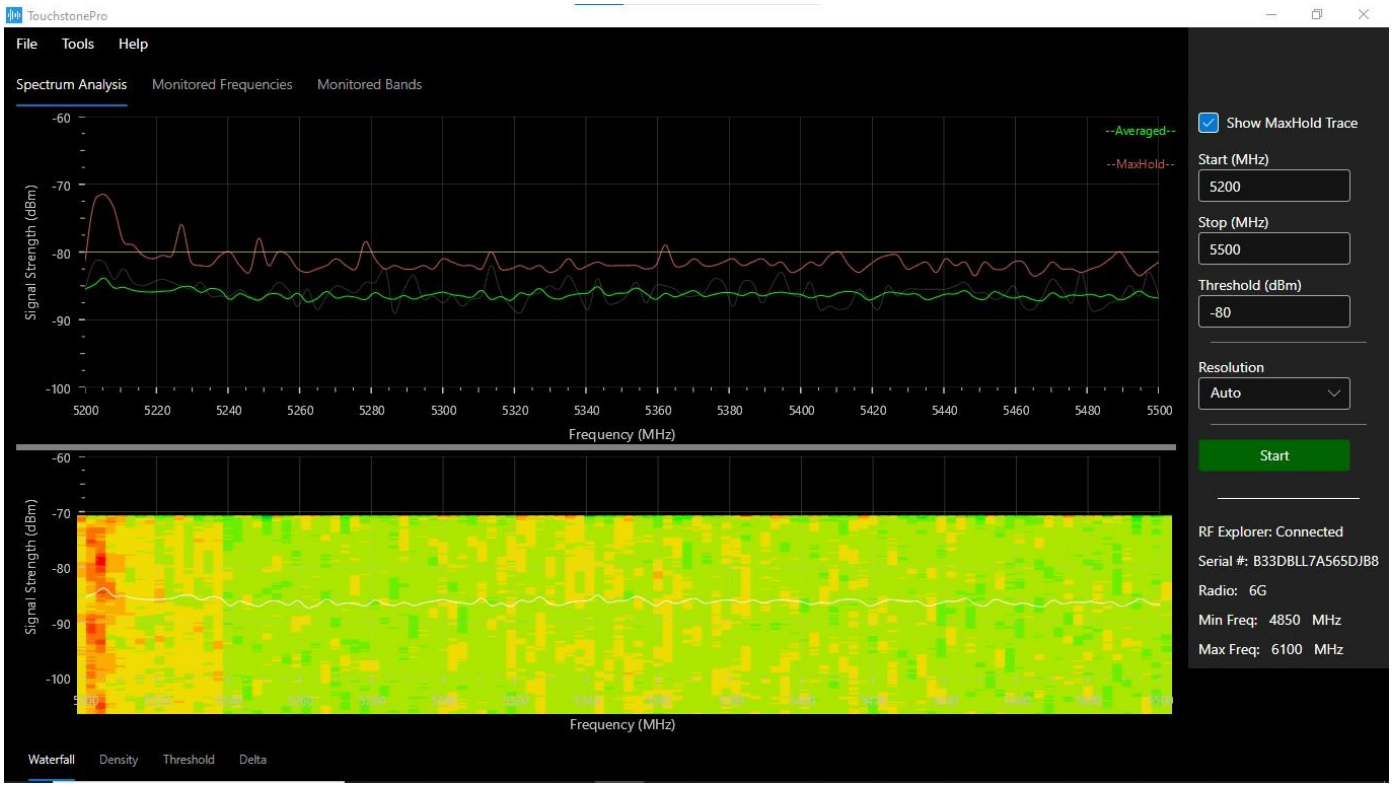
11:04am Image 13



11:10am Image 14



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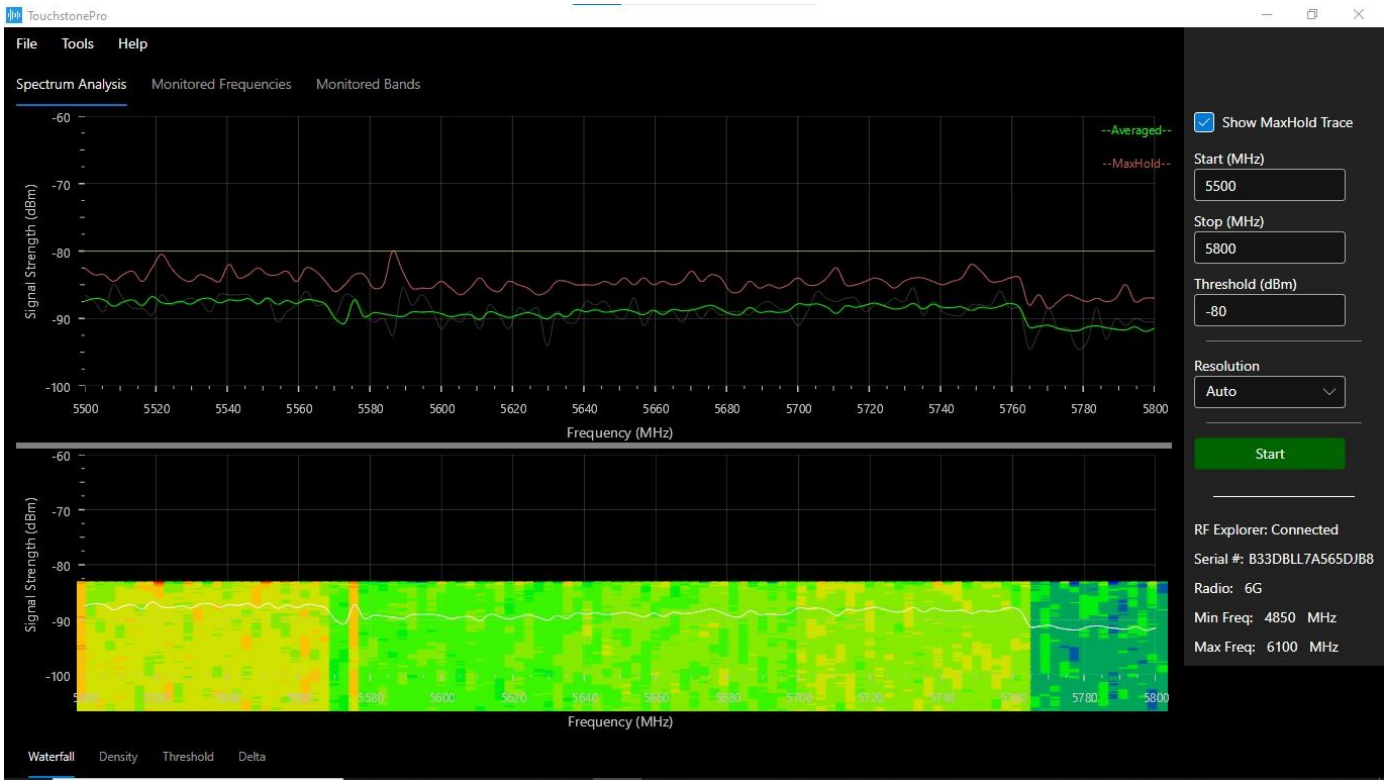
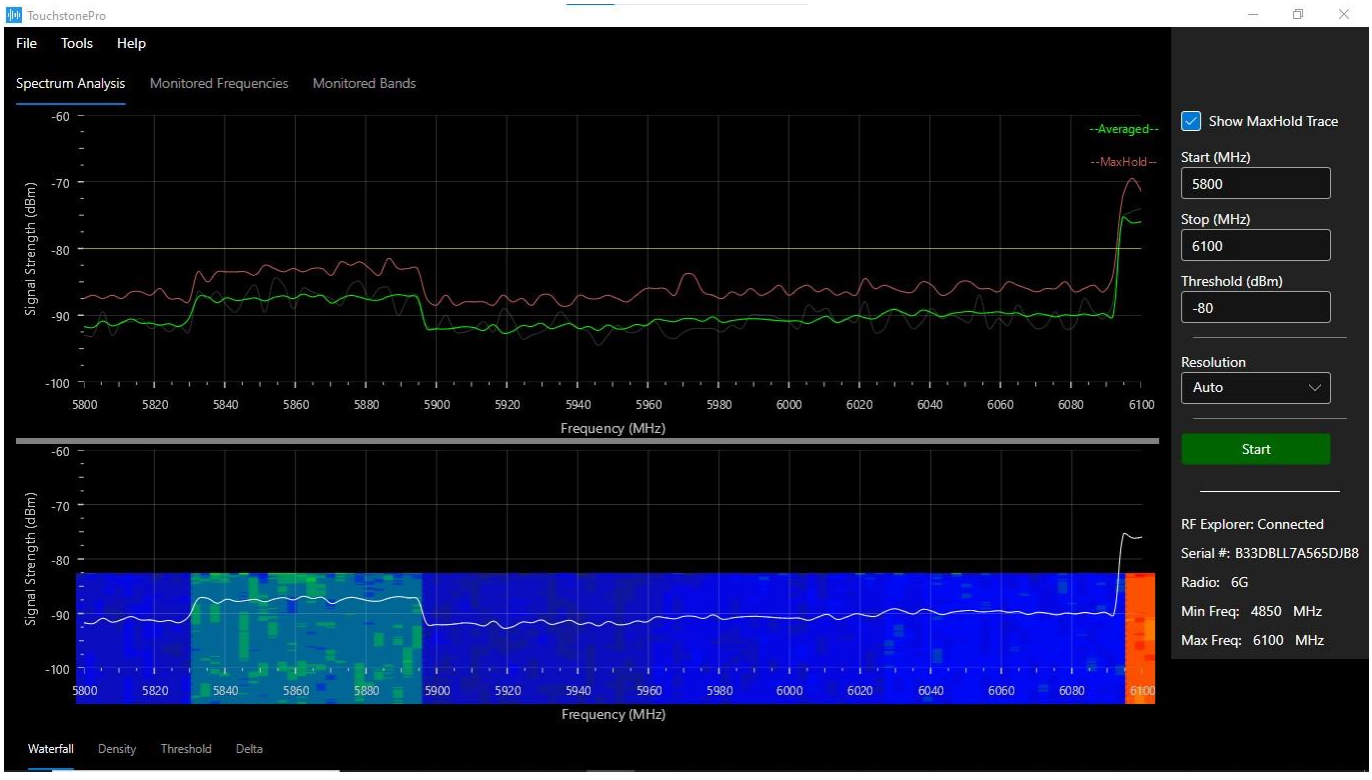
11:15am Image 15



11:23am Image 16



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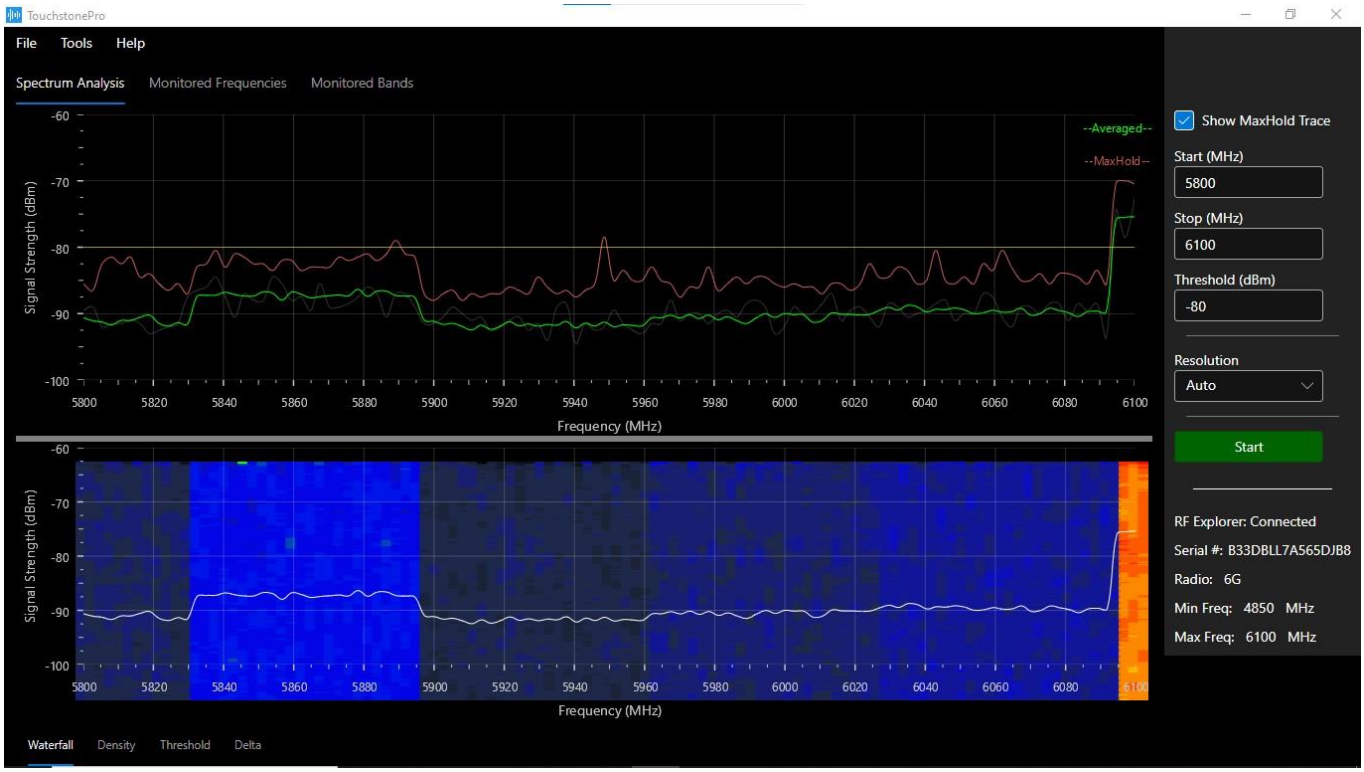
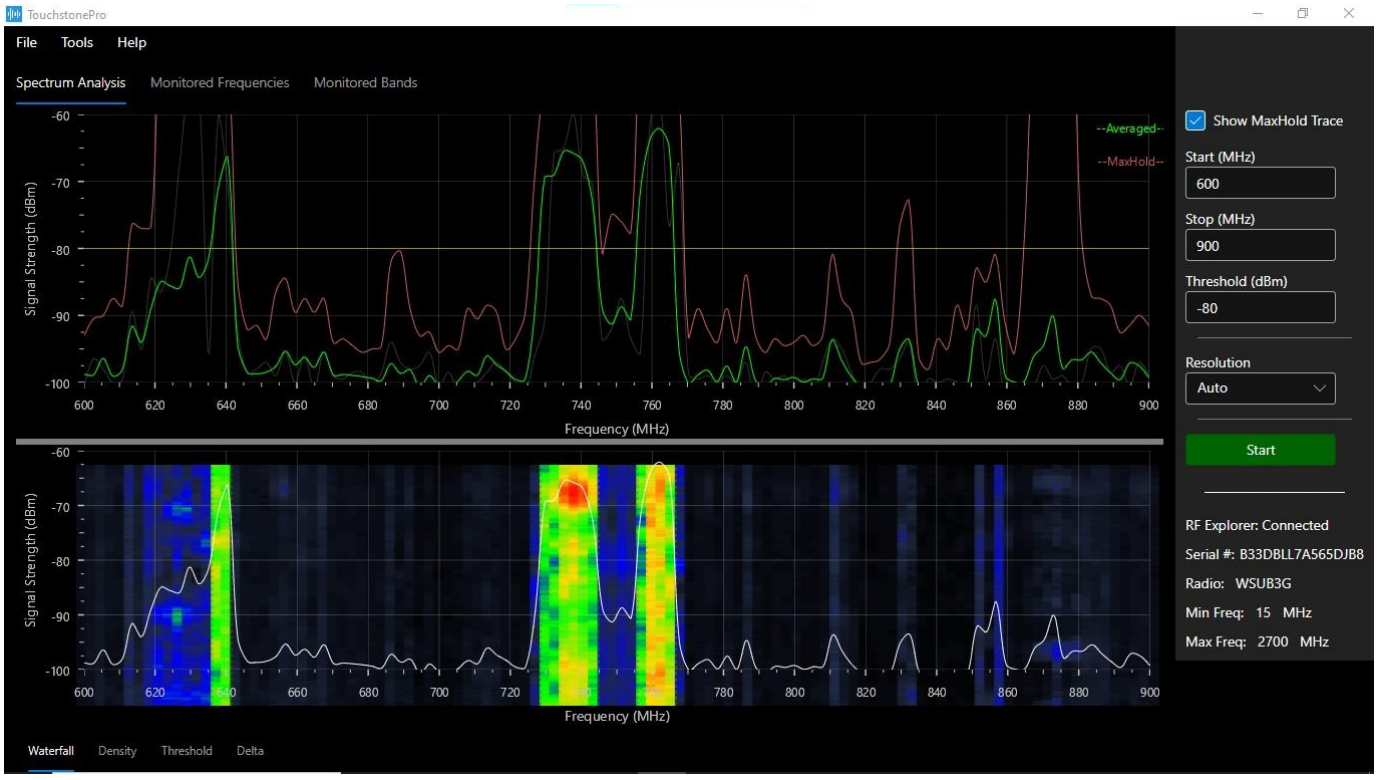
4:30pm Image 17



4:42pm Image 18



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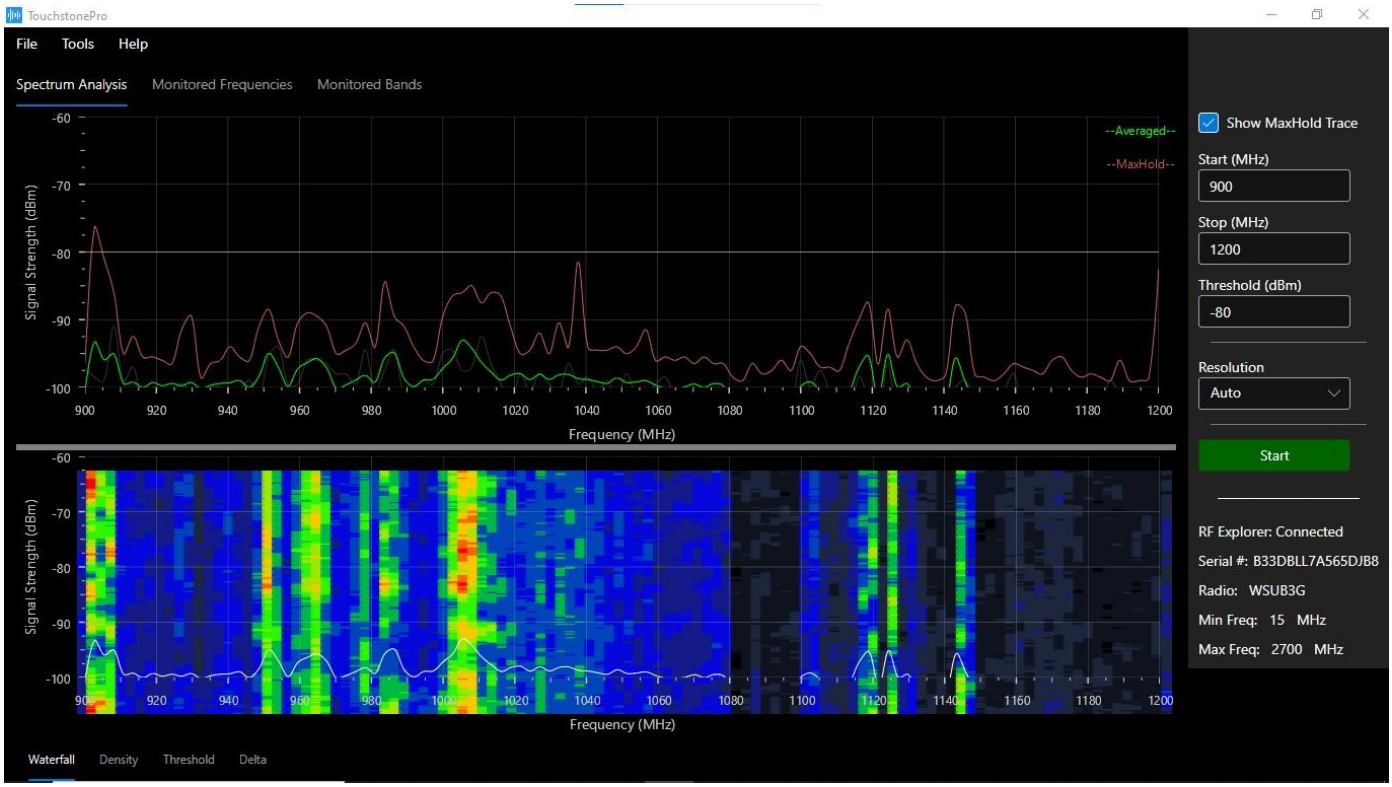
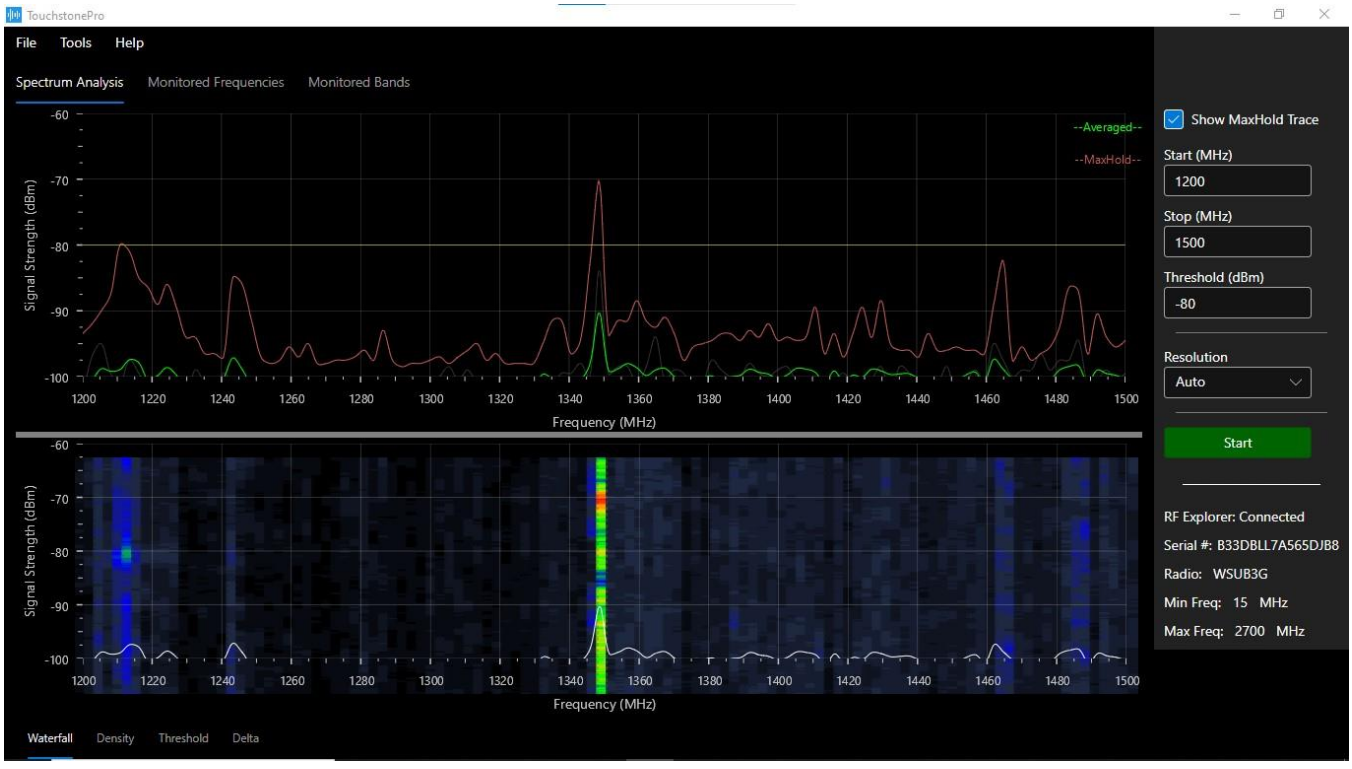
4:49pm Image 19



4:57pm Image 20



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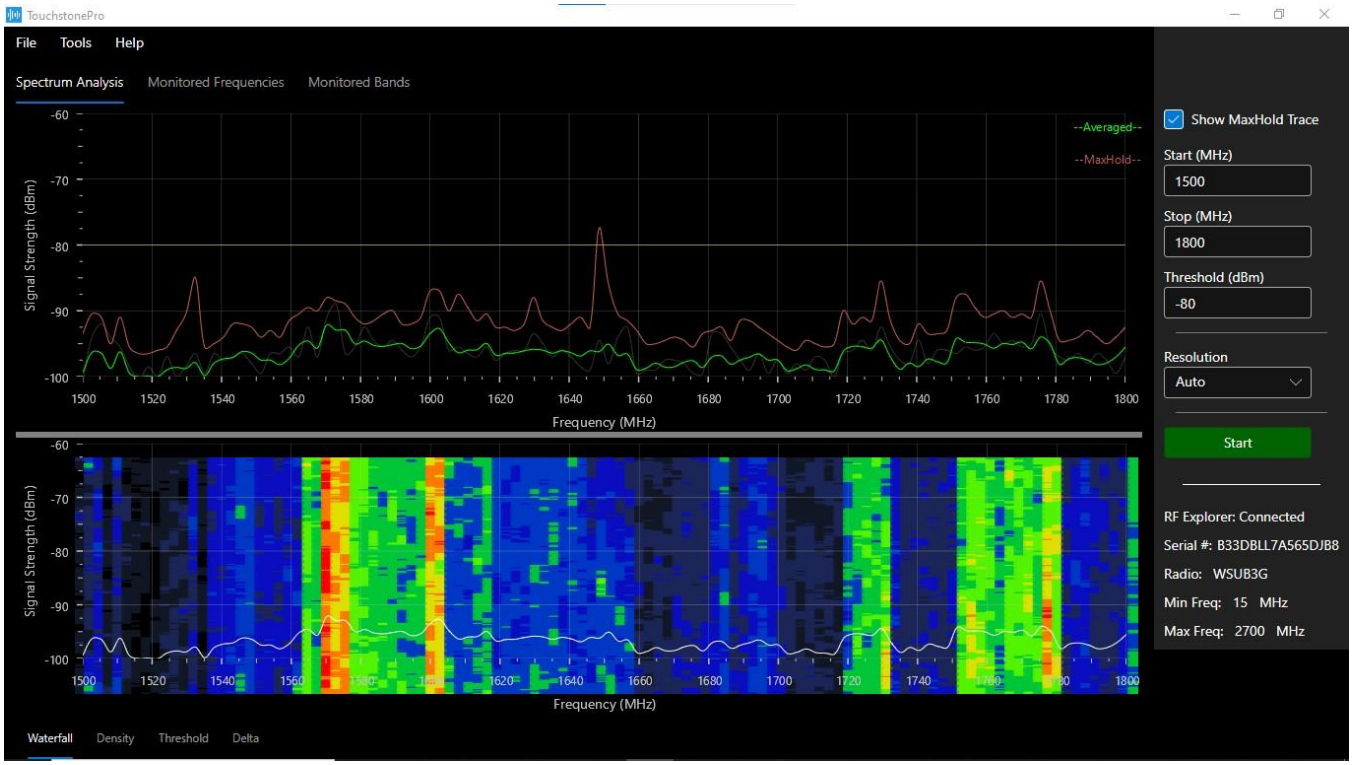
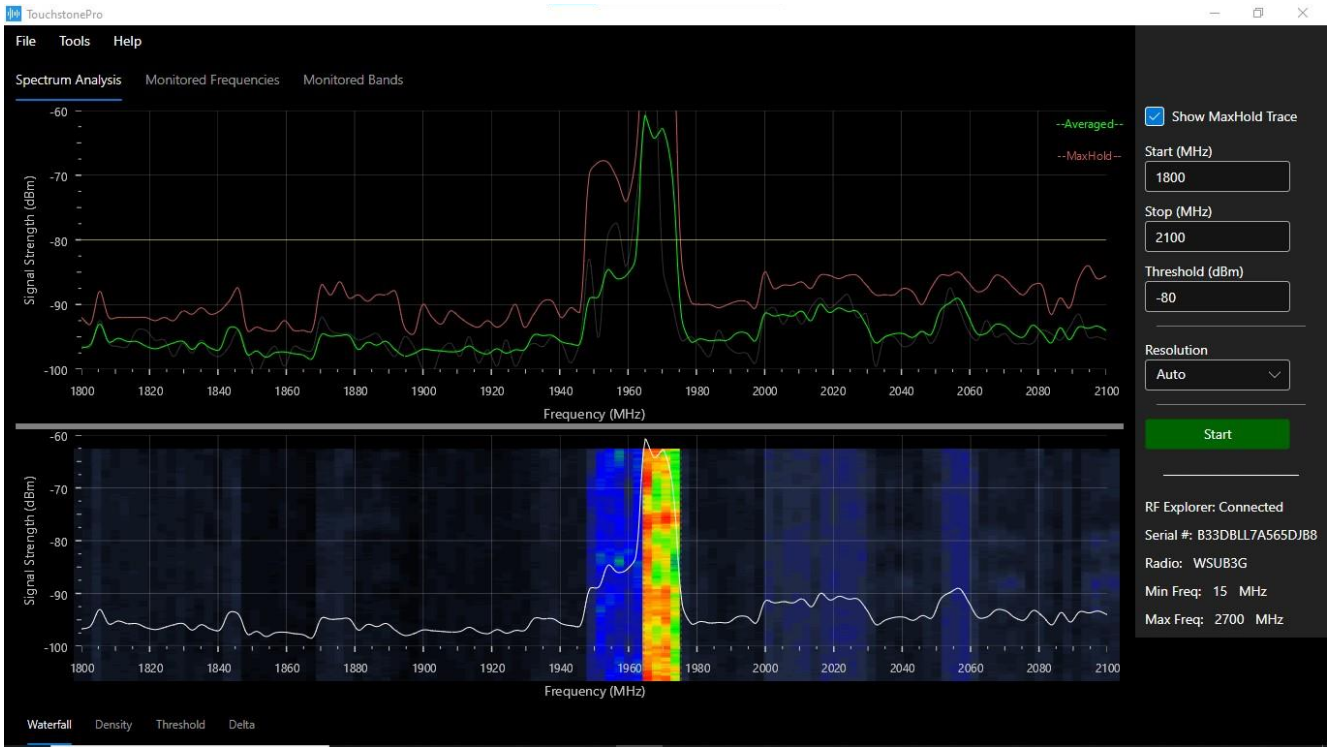
5:05pm Image 21



5:11pm Image 22



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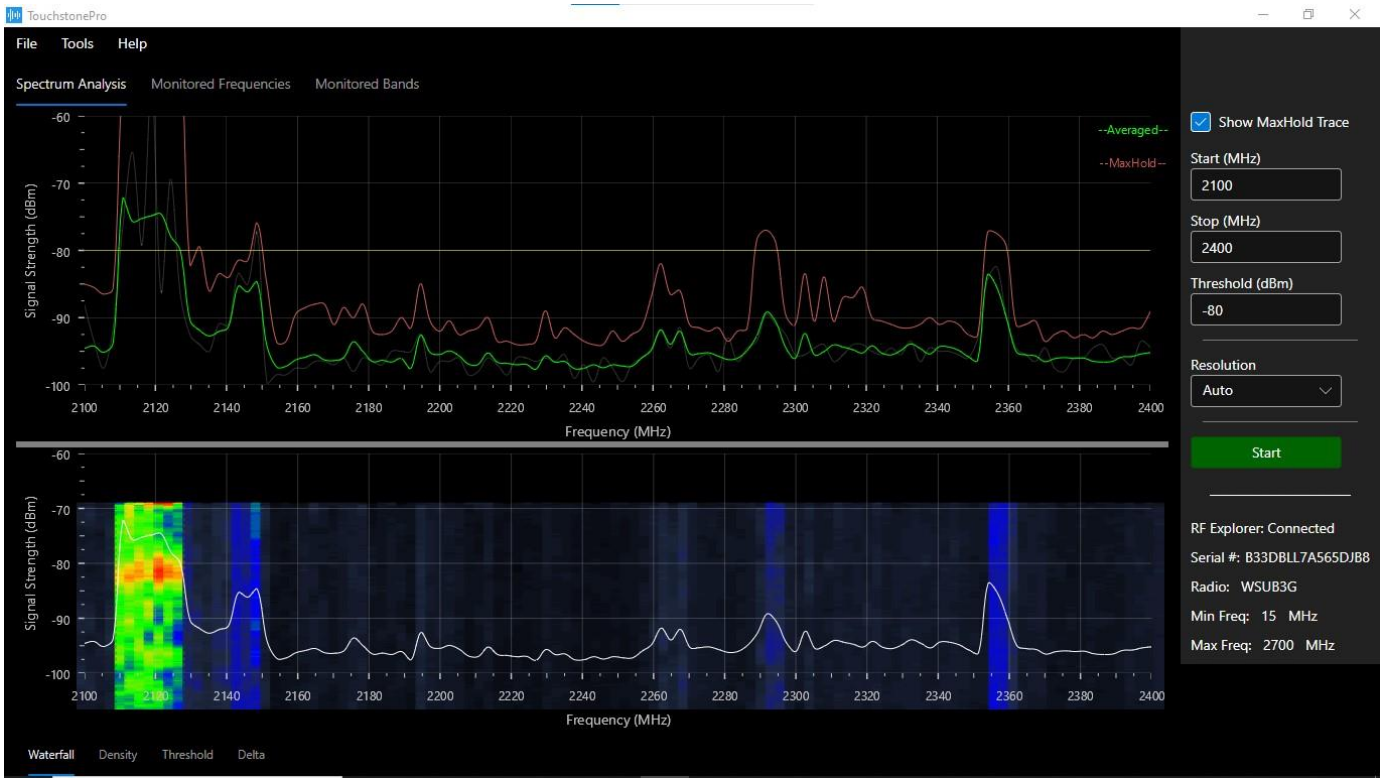
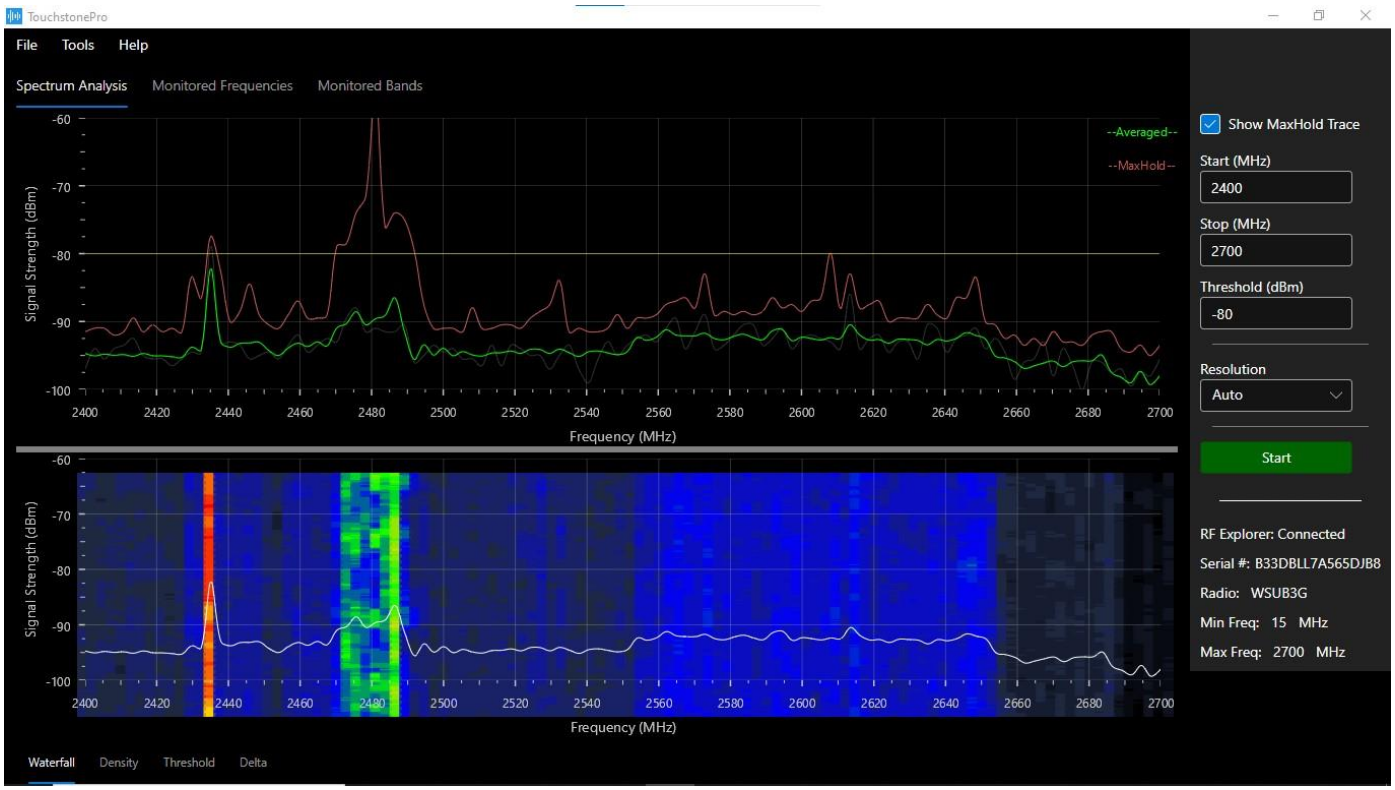
5:17pm Image 23



5:23pm Image 24



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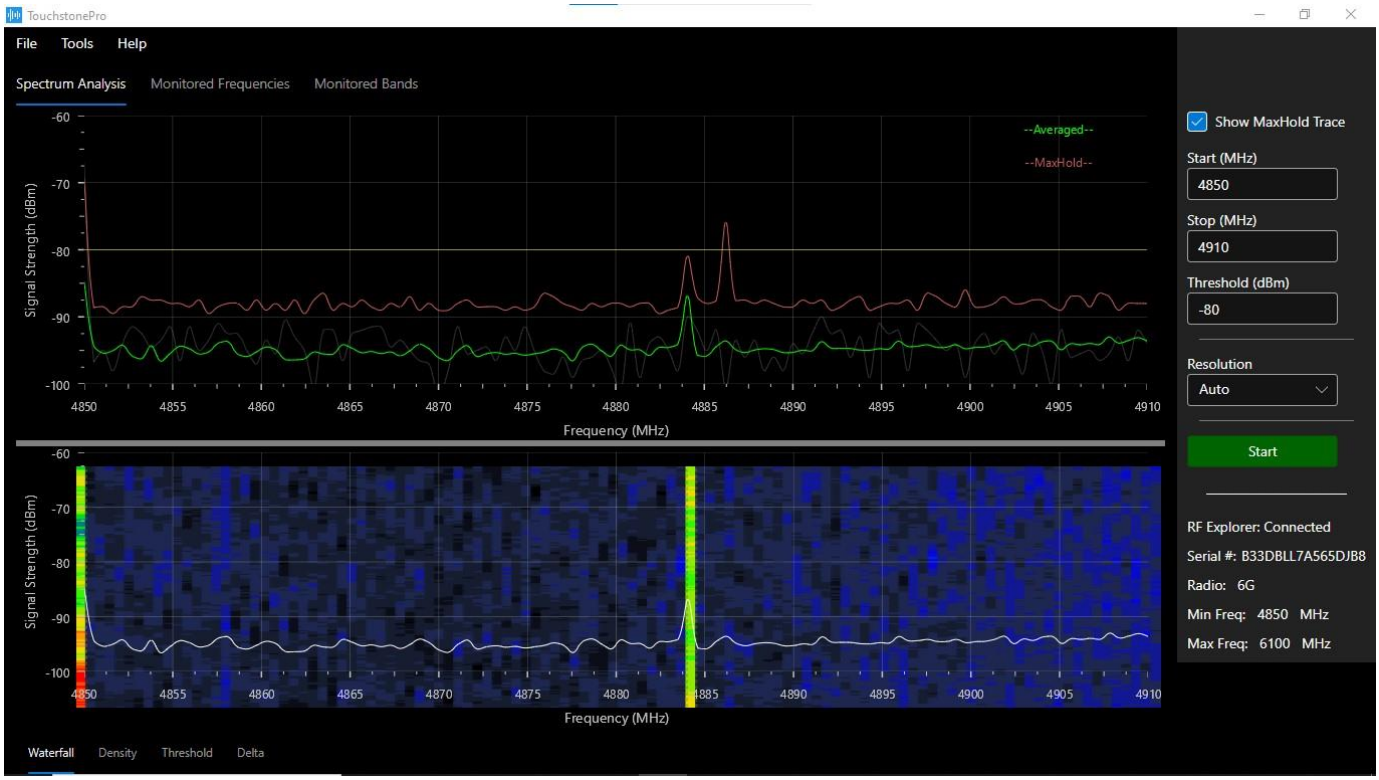
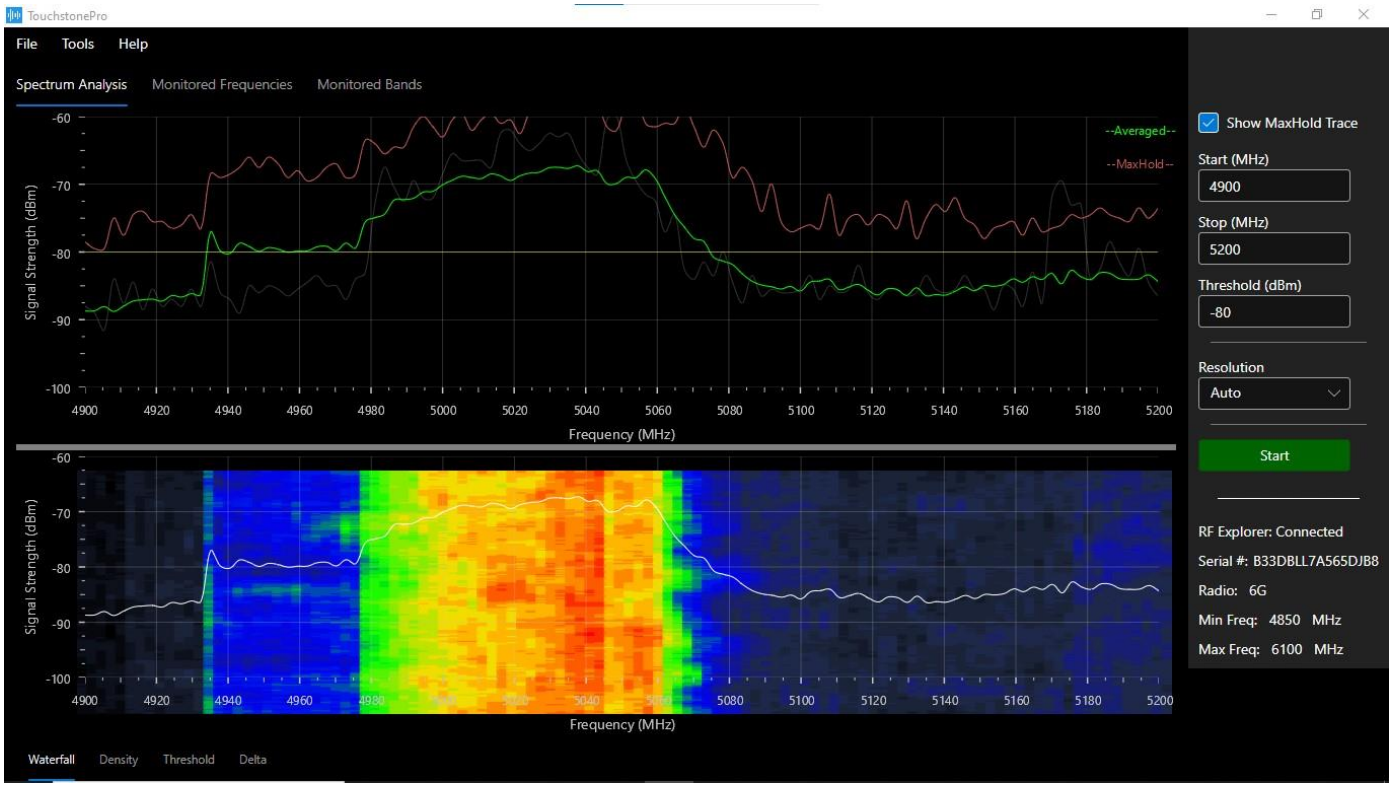
5:31pm Image 25



5:35pm Image 26



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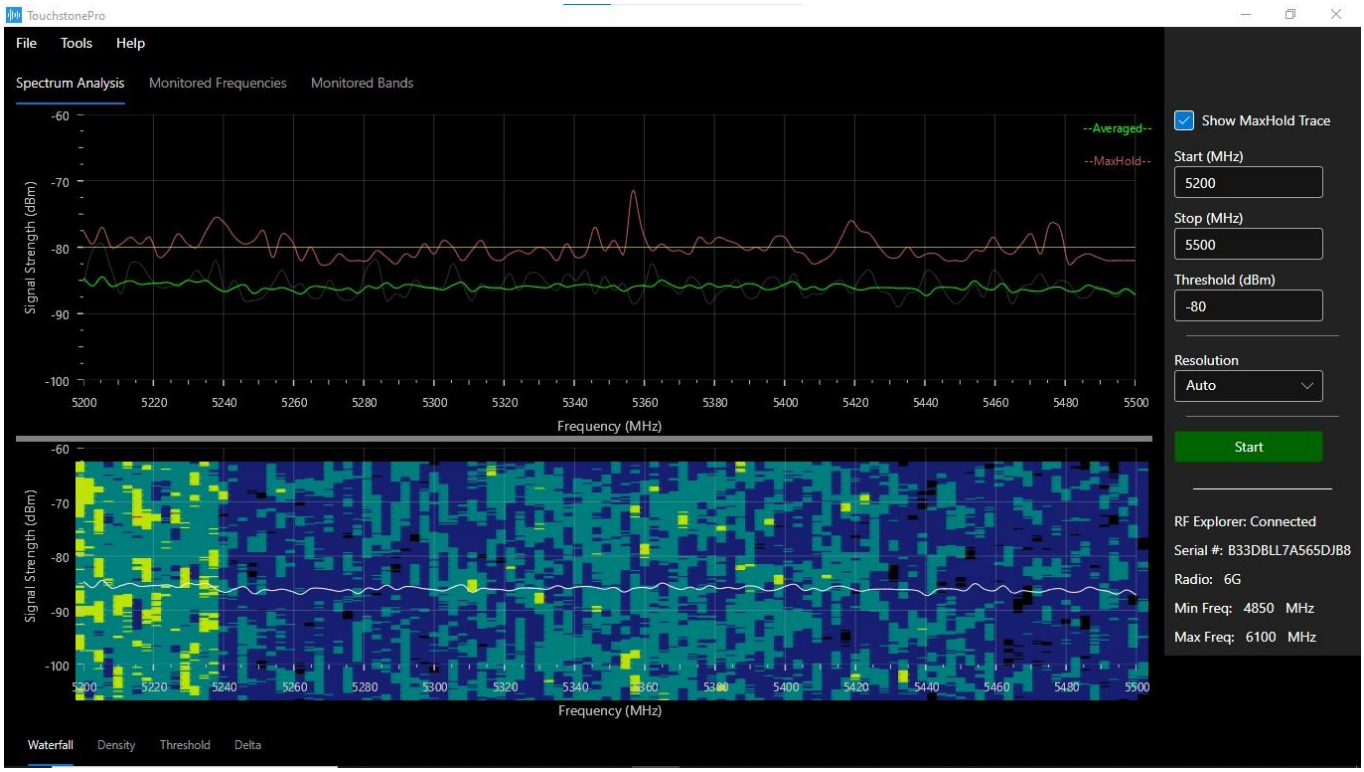
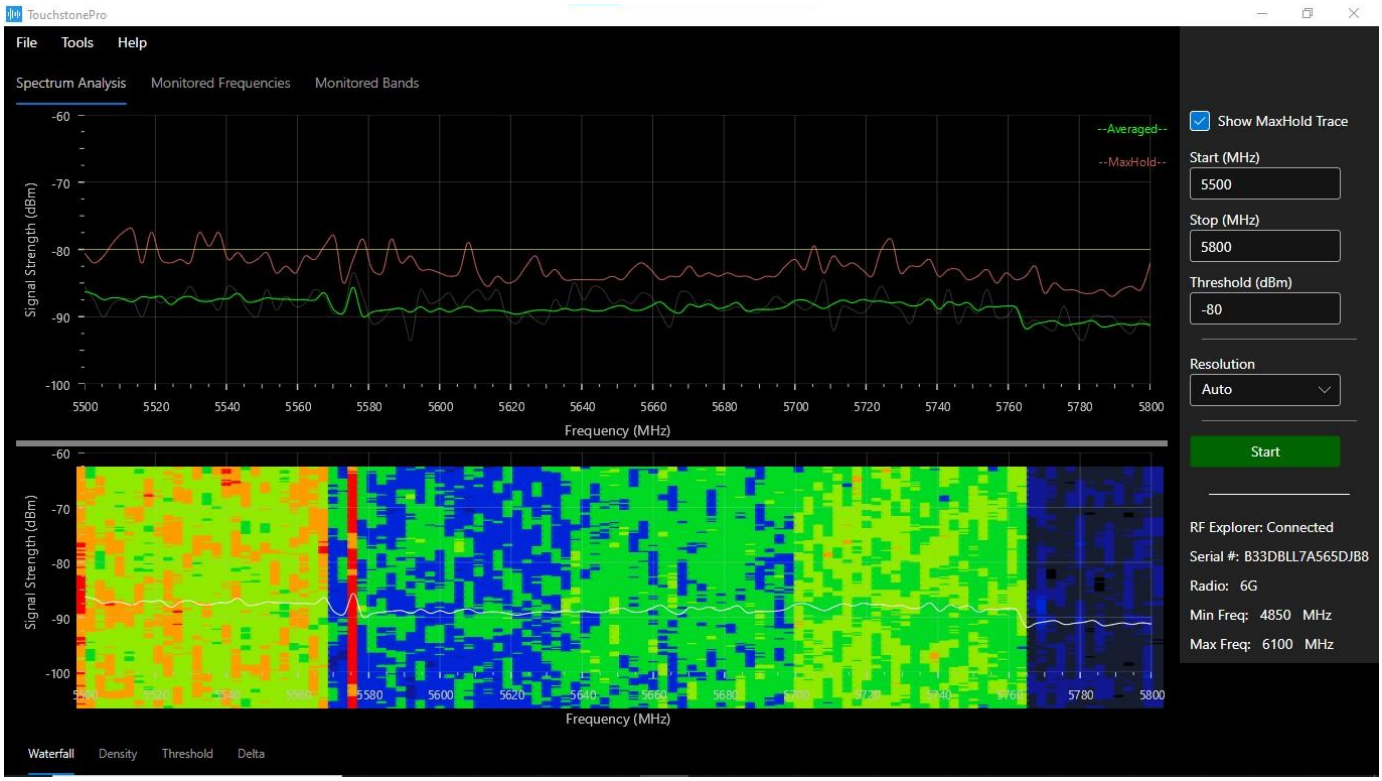
5:40pm Image 27



5:45pm Image 28



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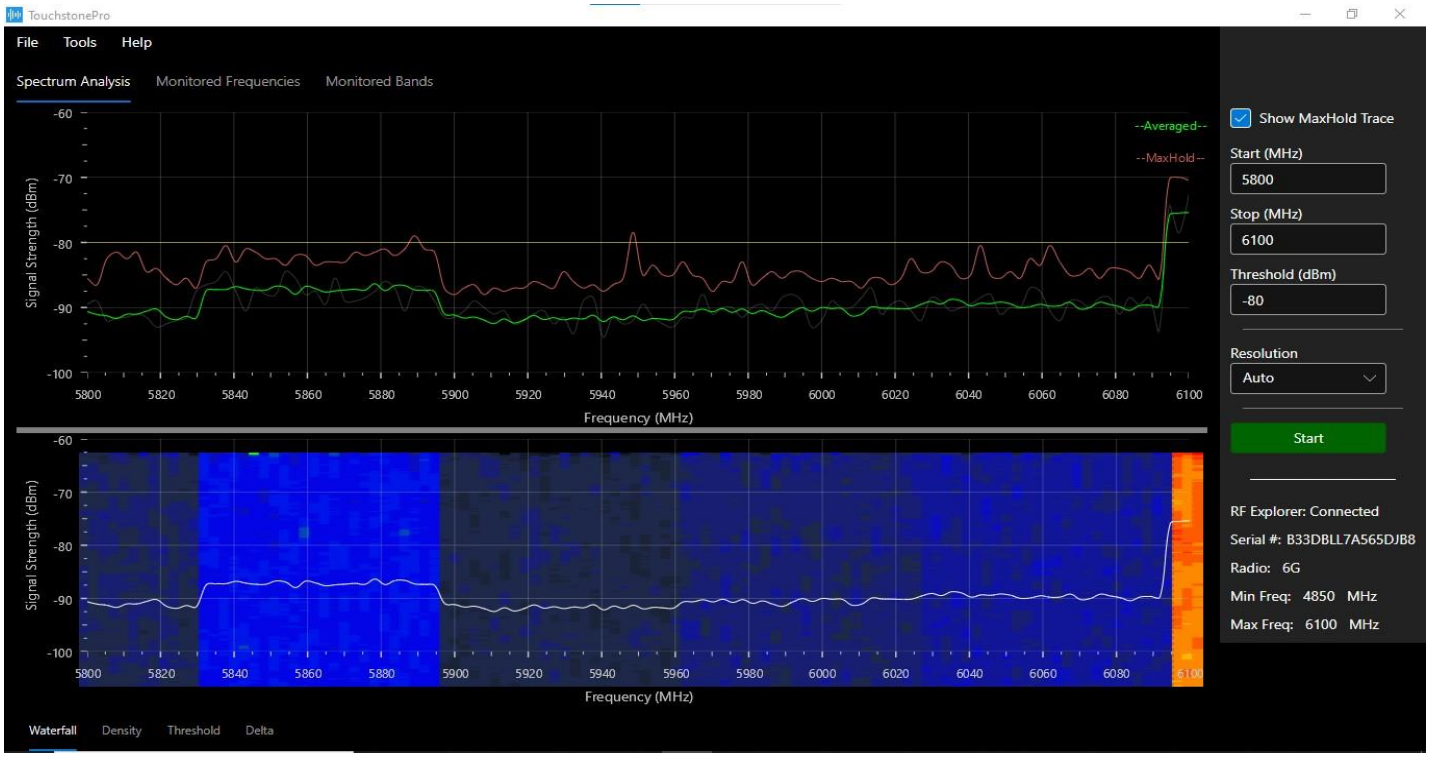
5:59pm Image 29



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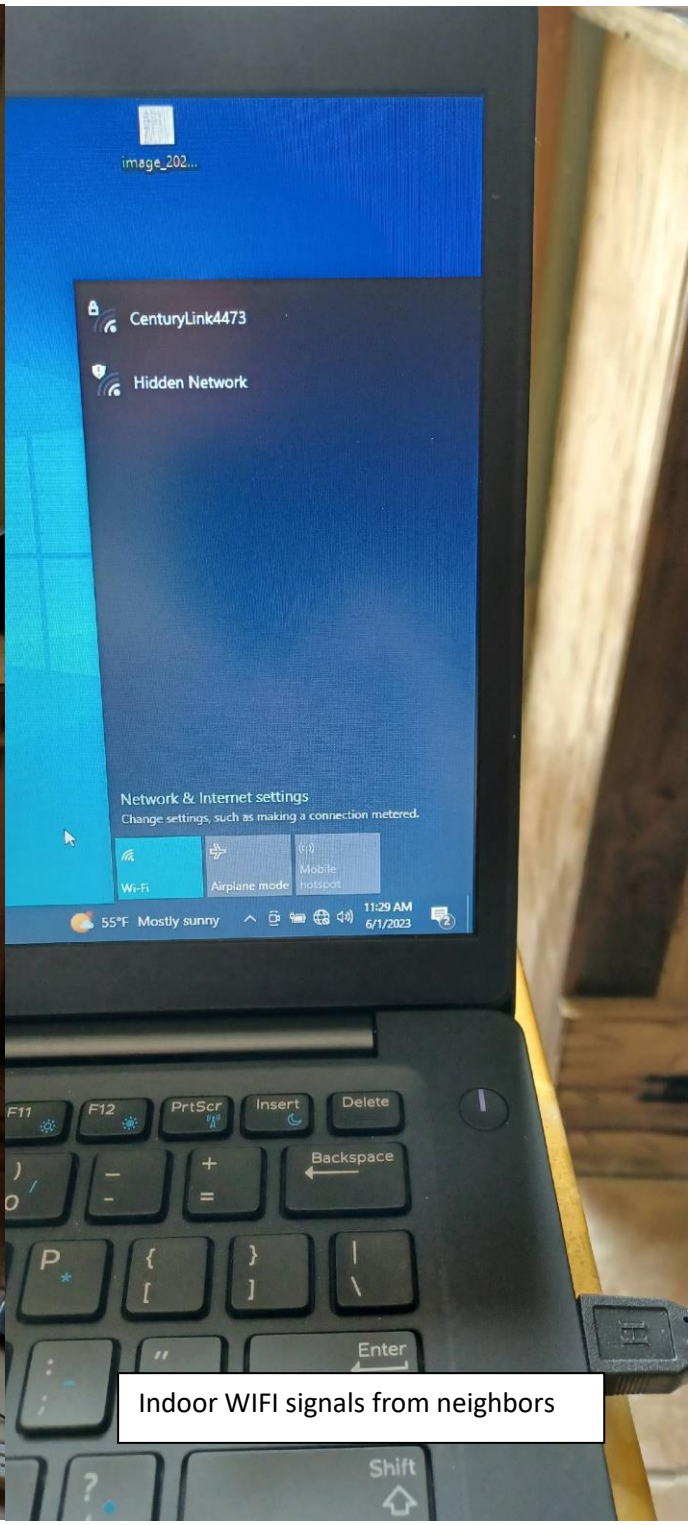
INDOOR SCAN

Indoor meter setup



Indoor WIFI signals from neighbors

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INDOOR HF59B SCAN

Location All measurements taken Inside Home at Dining Area	Date/Time	HF59B Peak setting UBB27 Antenna	Building Biology Precautionary Guidline	HF59B Average Setting UBB27 Antenna	Building Biology Precautionary Guidline
		mW/m^2 no concern <0.000,1 Slight 0.000,1-0.01 Severe 0.01-1 Extreme >1	SMB-2015 Sleeping areas Extreme Concern Level	mW/m^2 no concern <0.000,1 Slight 0.000,1-0.01 Severe 0.01-1 Extreme >1	SMB-2015 Sleeping areas Extreme Concern Level
6/1/2023	9:23am	1.10mW	Extreme	4.5-7uW	Slight
	9:33am	4.04mW	Extreme	NA	Slight
	9:45am	4.9mW	Extreme	4.55-5.4uW	Slight
	9:53am	.74mW	Severe	3.8-7.6uW	Slight
	9:56am	.56mW	Severe	6.3-8.5uW	Slight
	10.04am	2.36mW	Extreme	4.35-7.23uW	Slight
	10:11am	9.32mW	Extreme	7.82-9.5uW	Slight
	10:54am	16mW	Extreme	At this point I concentrated on the peak readings due to the average levels that were shown	
	10:59am	5.69mW	Extreme		
	11:11am	.46mW	Severe		
	11:13am	6.8mW	Extreme		
	11:14am	19.4mW	Extreme		
	11:15am	3.1mW	Extreme		
	11:16am	9.31mW	Extreme		
	11.22am	4.51mW	Extreme		
	11:26am	5.21mW	Extreme		

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INDOOR RF EXPLORER SCAN

6/1/2023				
	Peak			
Time AM	Frequency MHz	dBm	uW	Image
9:27	584.77466	-73	0.00005	**1 &2**
	585.94583	-71	0.000079	**1&2**
	587.117	-72	0.000063	**1&2**
9:40	627	-58	0.001584	**3**
	630	-58	0.001584	**3**
9:42	758.753024	-71	0.000079	**4**
	765.841425	-71	0.000079	**4**
9:54	989.1891	-86	0.000002	**5**
9:57	1124.32425	-94	0.0000003	**6**
9:59	1348.6485	-76	0.000025	**7**
10:07	1348.6485	-76	0.000025	**8**
	1437.8376	-78	0.000015	**8**
10:19	1600	-82	0.000006	**9**
10:24	1964.8647	-60	0.000999	**10**
10:41	2481.081	-56	0.002511	**11**
10:52	4884.05402	-76	0.000025	**12**
11:04	4935.1351	-70	0.000099	**13**
11:10	5205.4054	-71	0.000079	**14**
11:15	5521.6216	-80	0.00001	**15**
	5586.4864	-80	0.00001	**15**
11:23	6097.297	-69	0.000125	**16**

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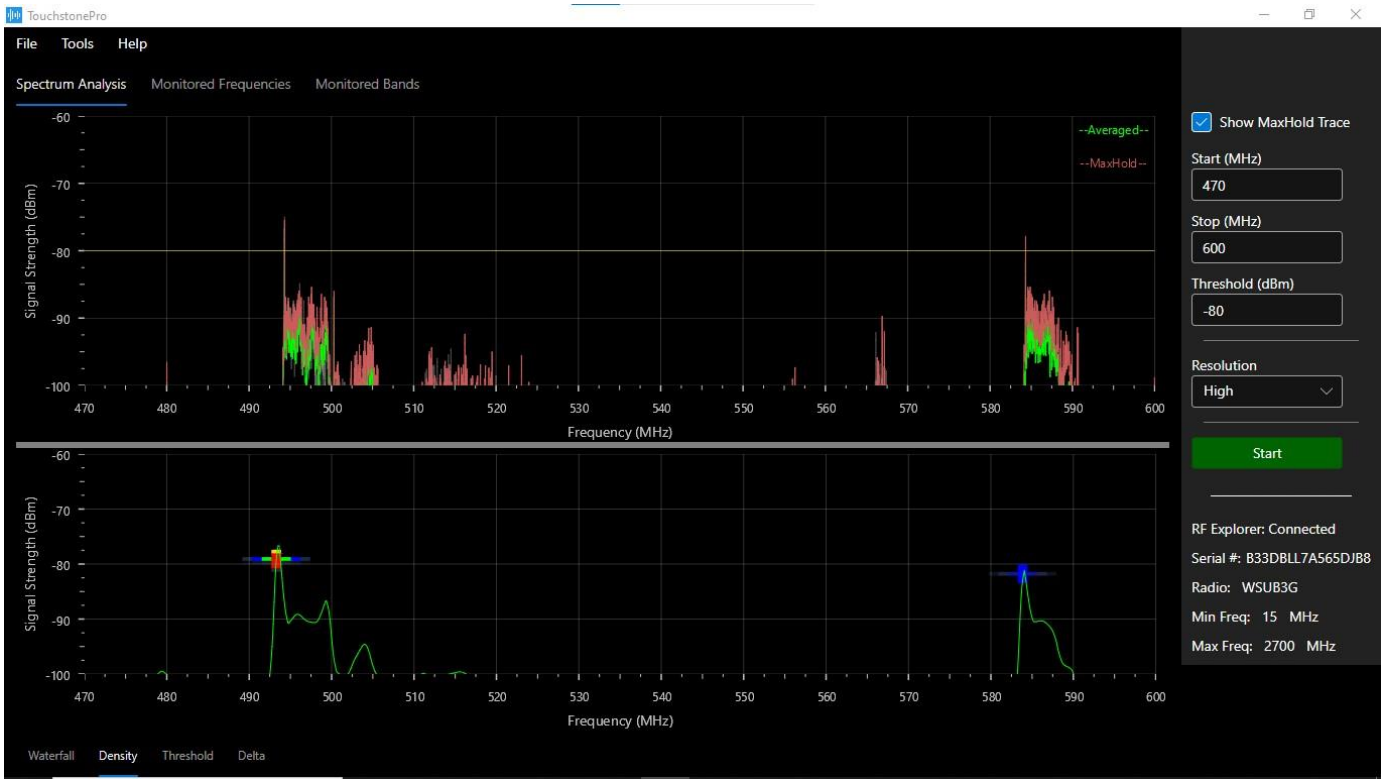
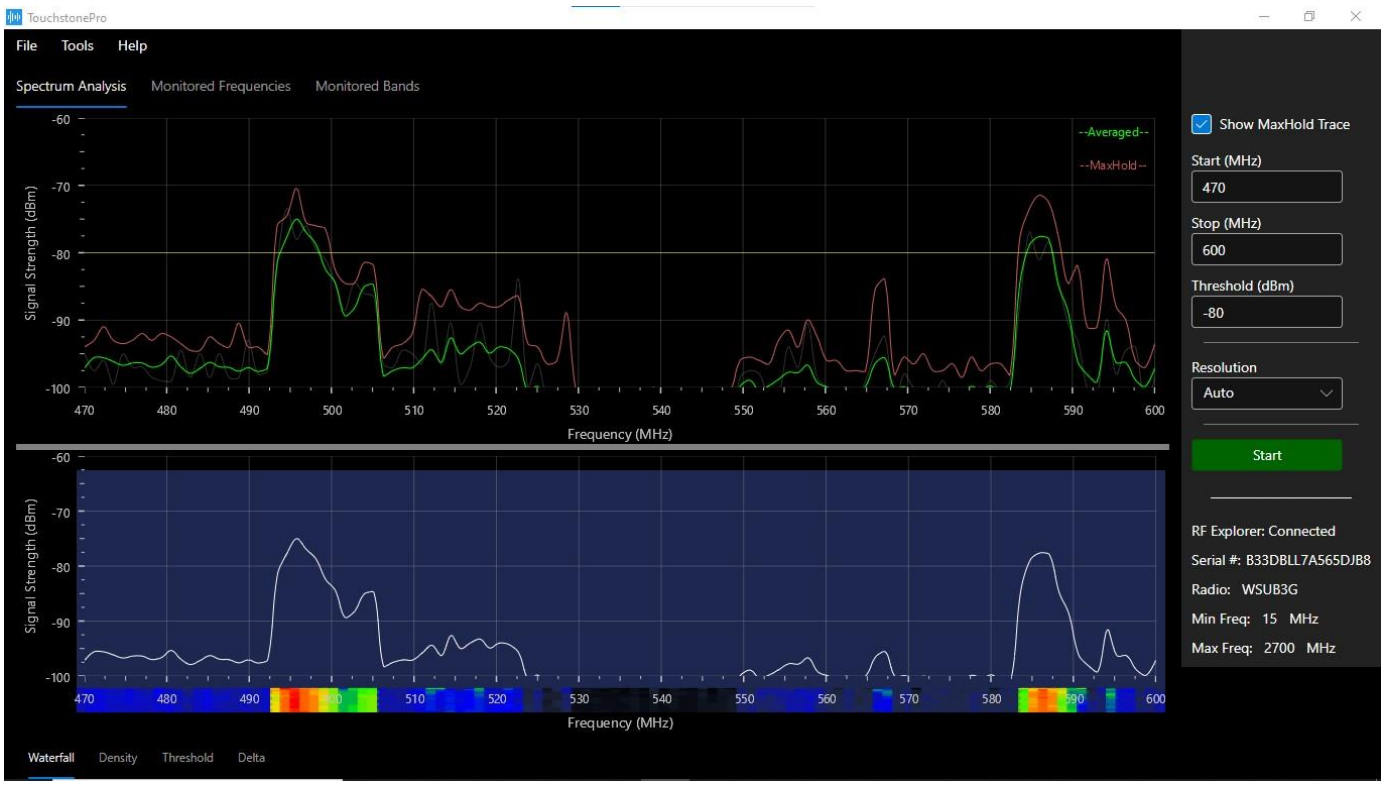
9:27am Image 1



9:27am Image 2



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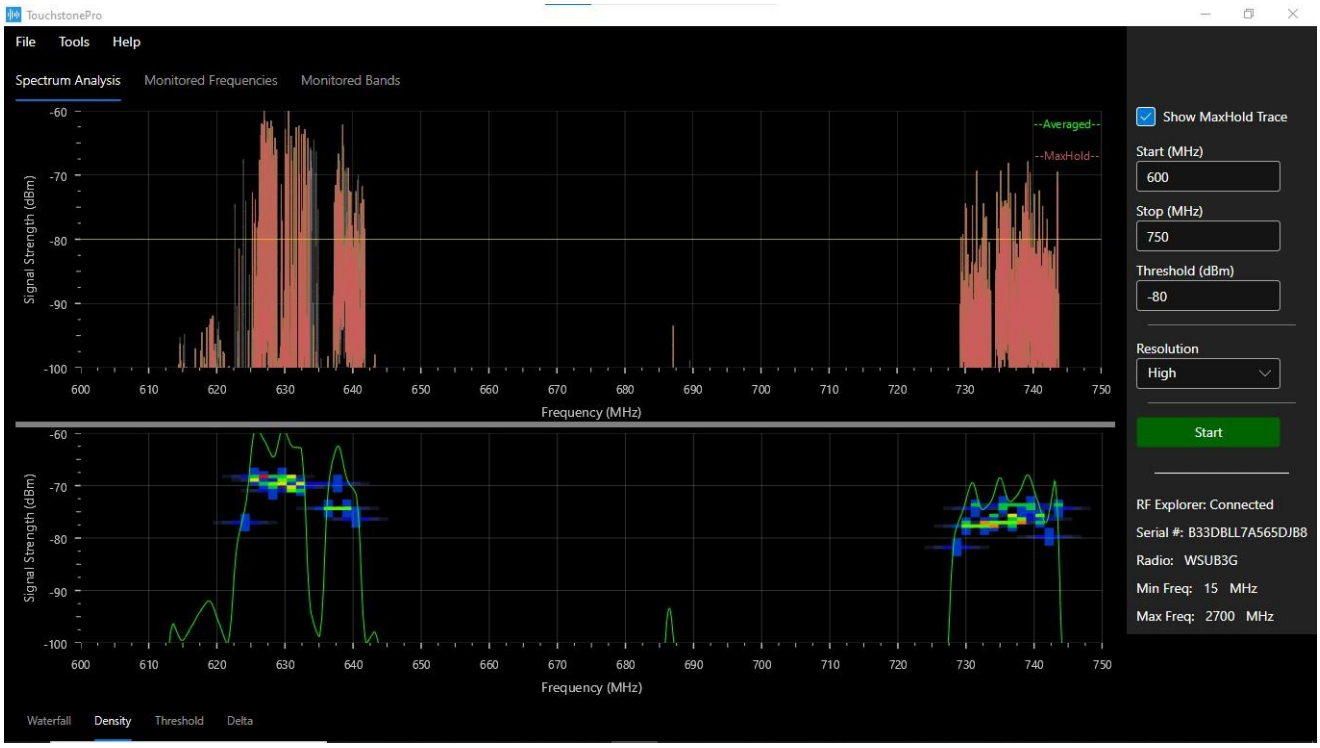
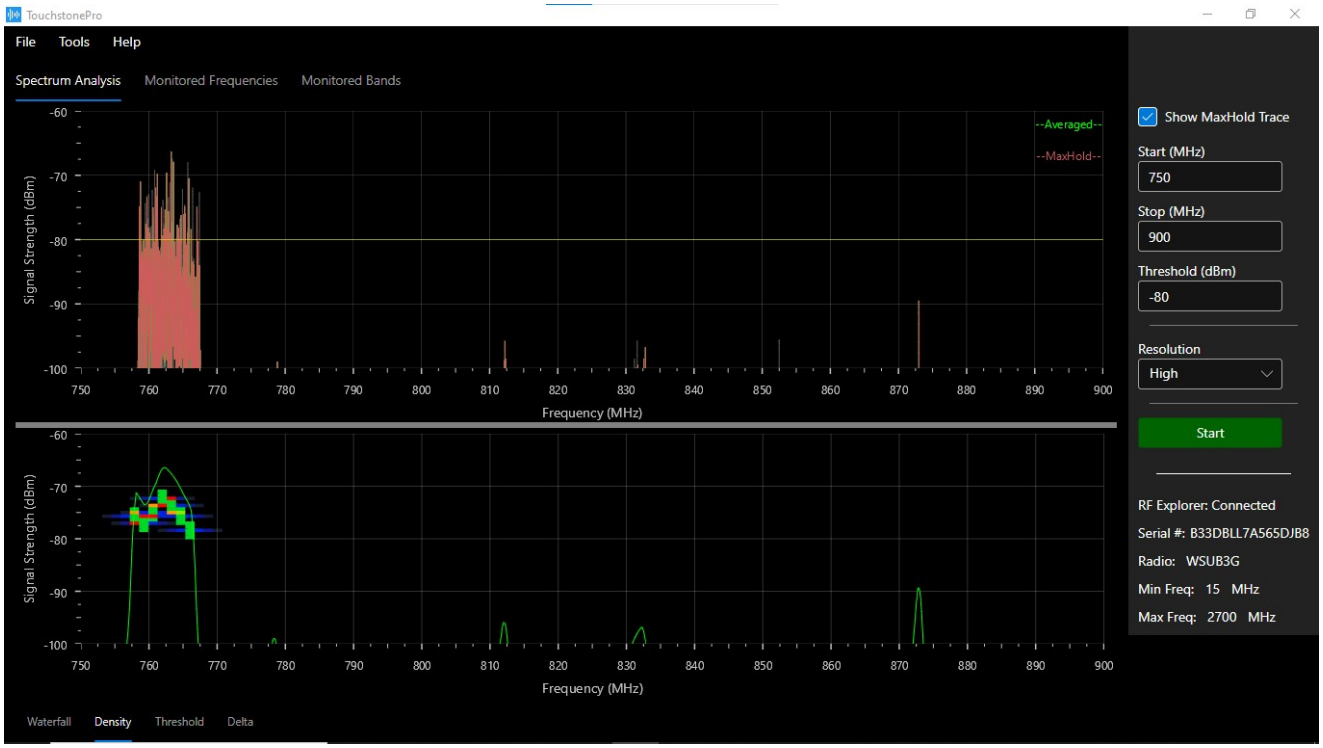
9:40am Image 3



9:42am Image 4



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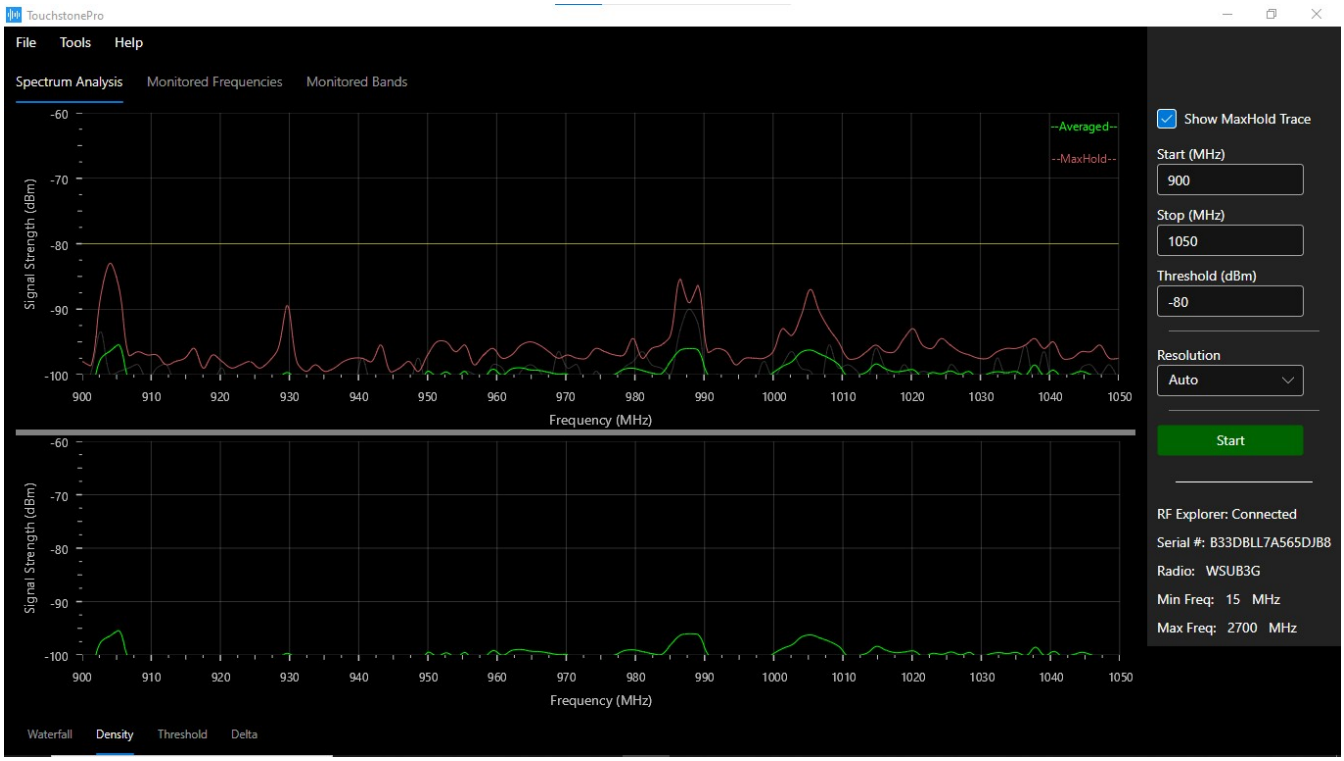
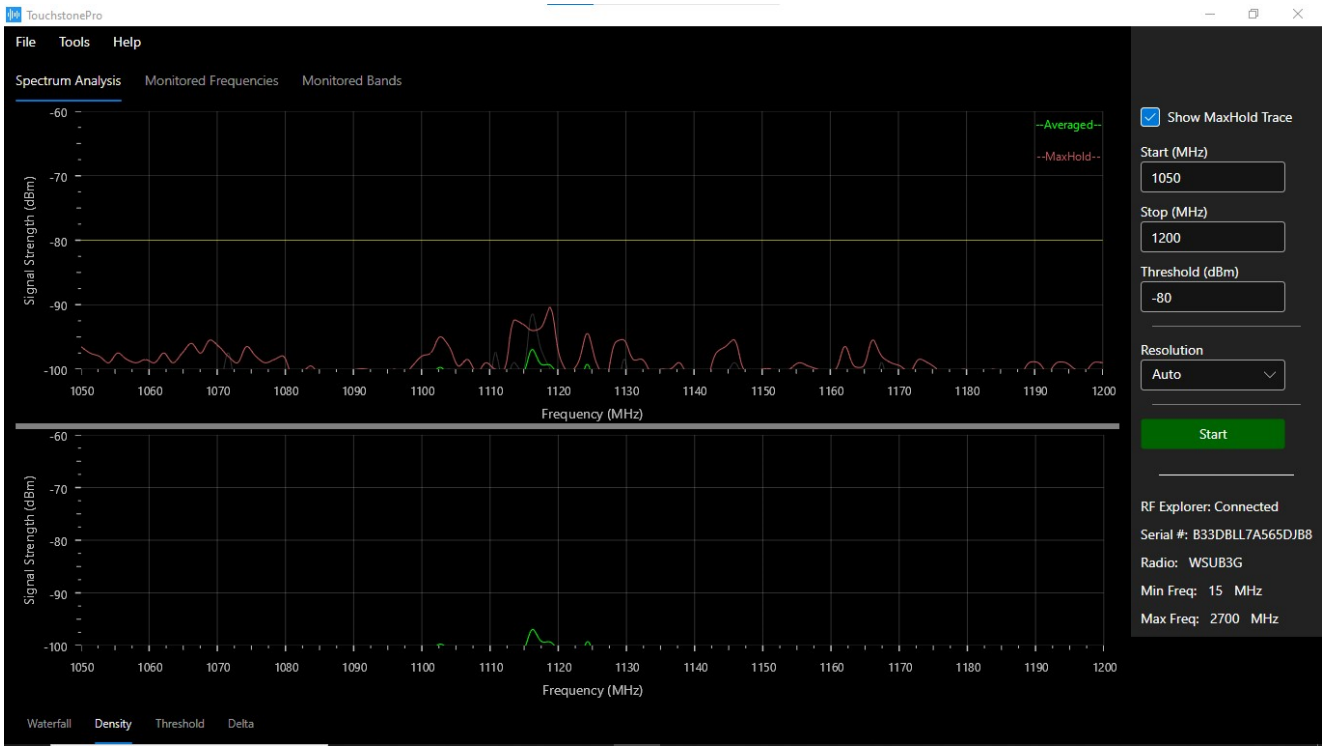
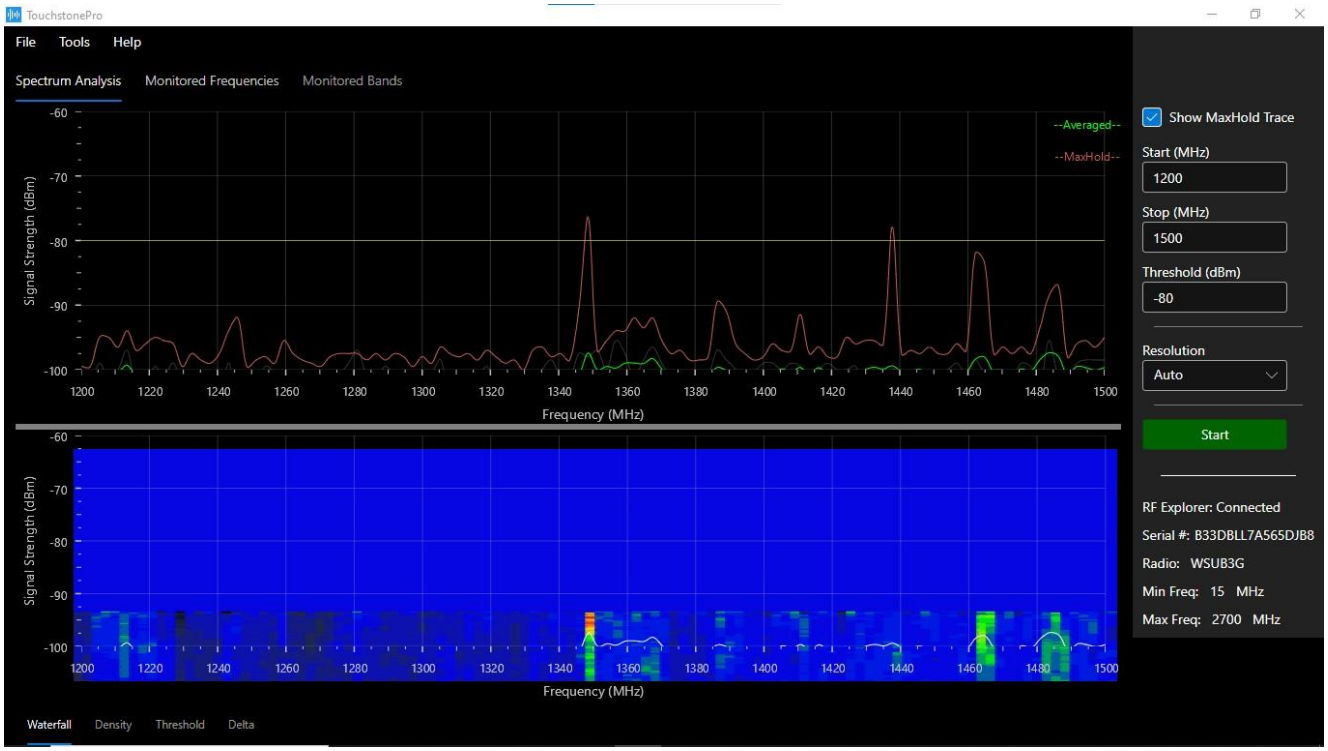
9:54am Image 5



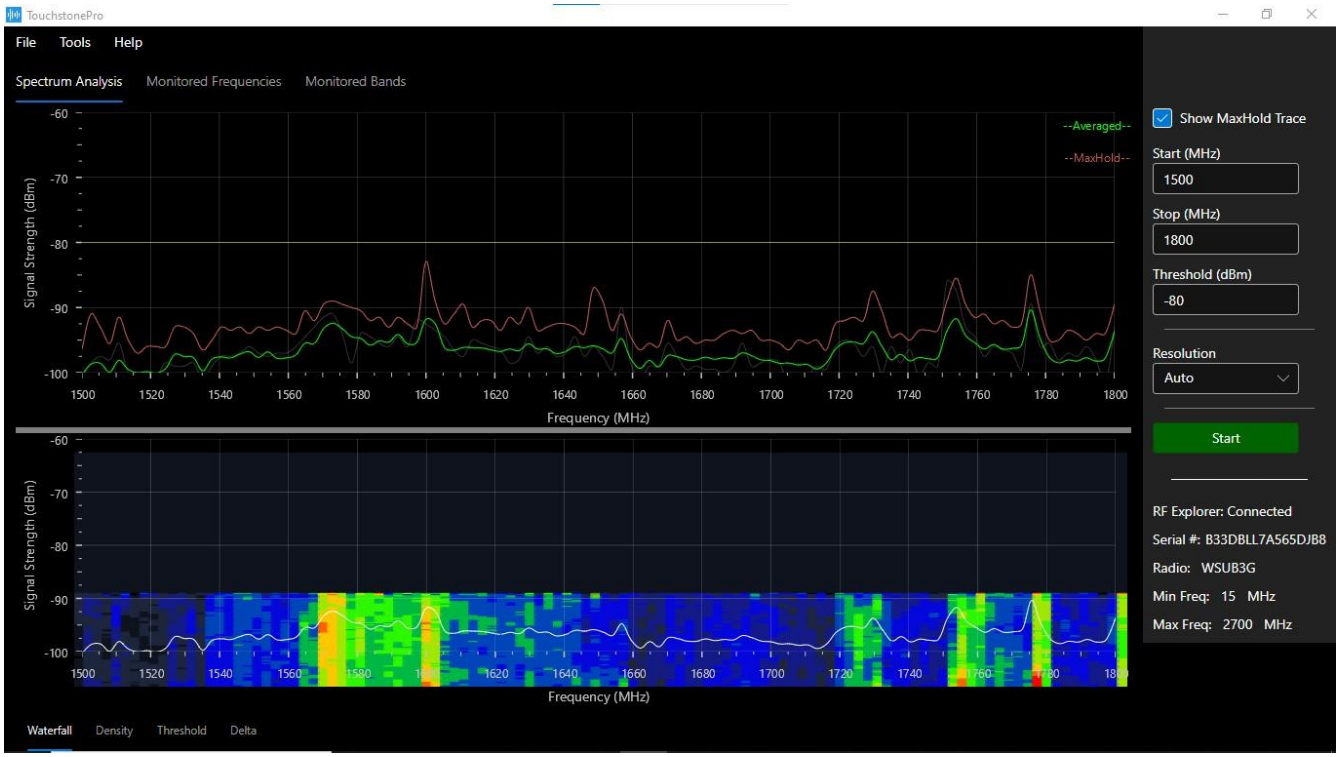
9:57am Image 6



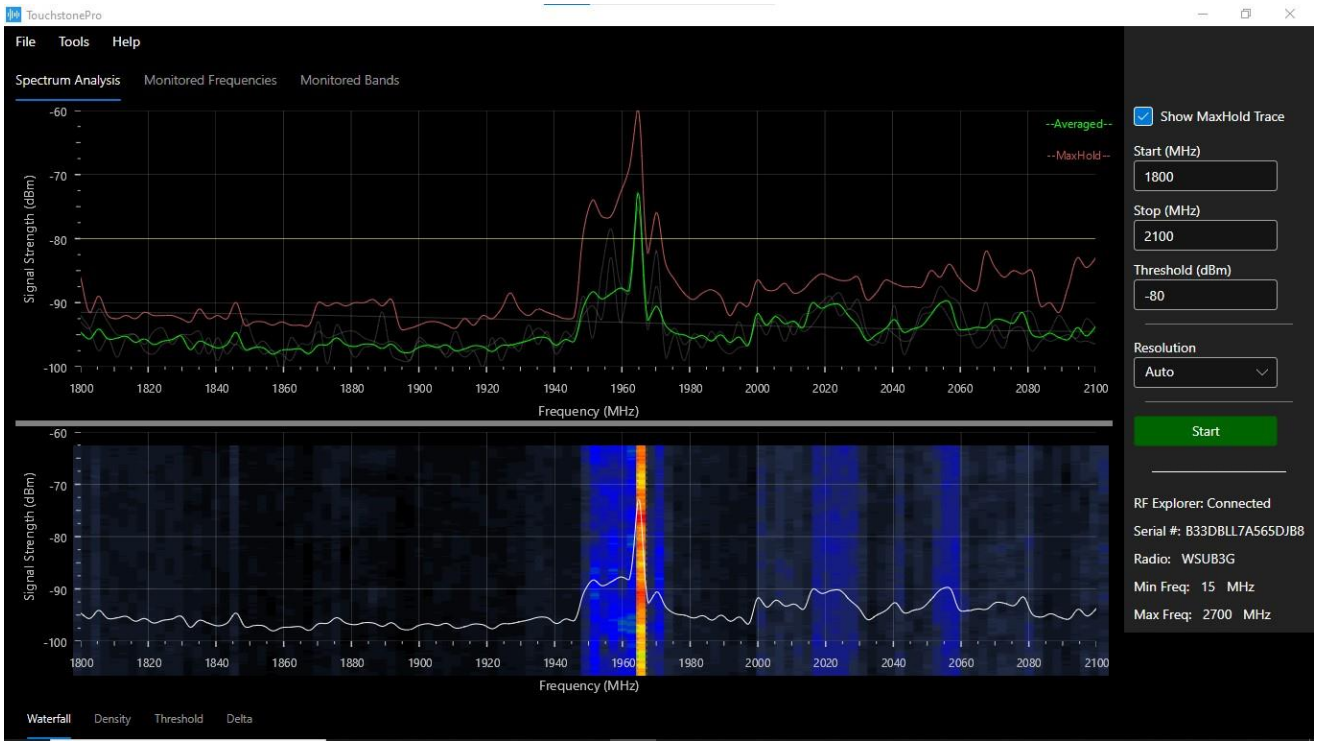
9:59am Image 7



10:07 am Image 8



10:19am Image 9



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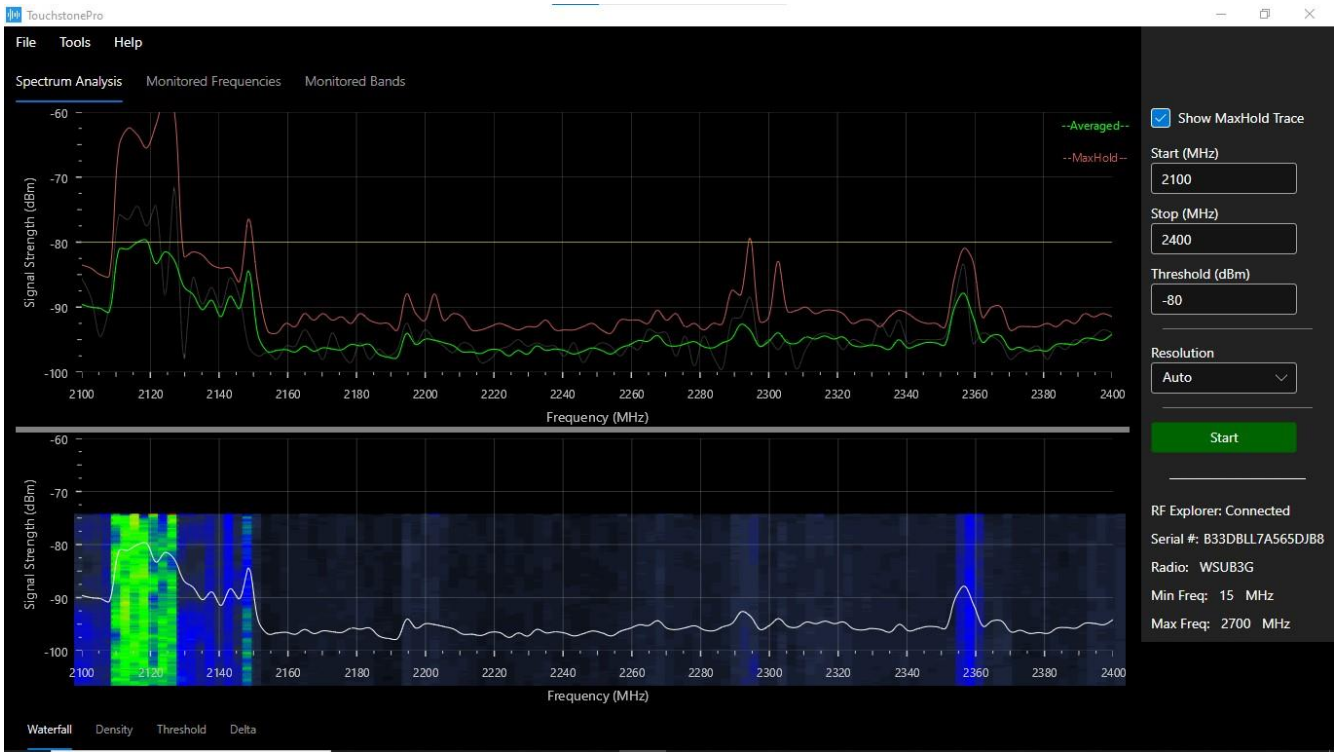

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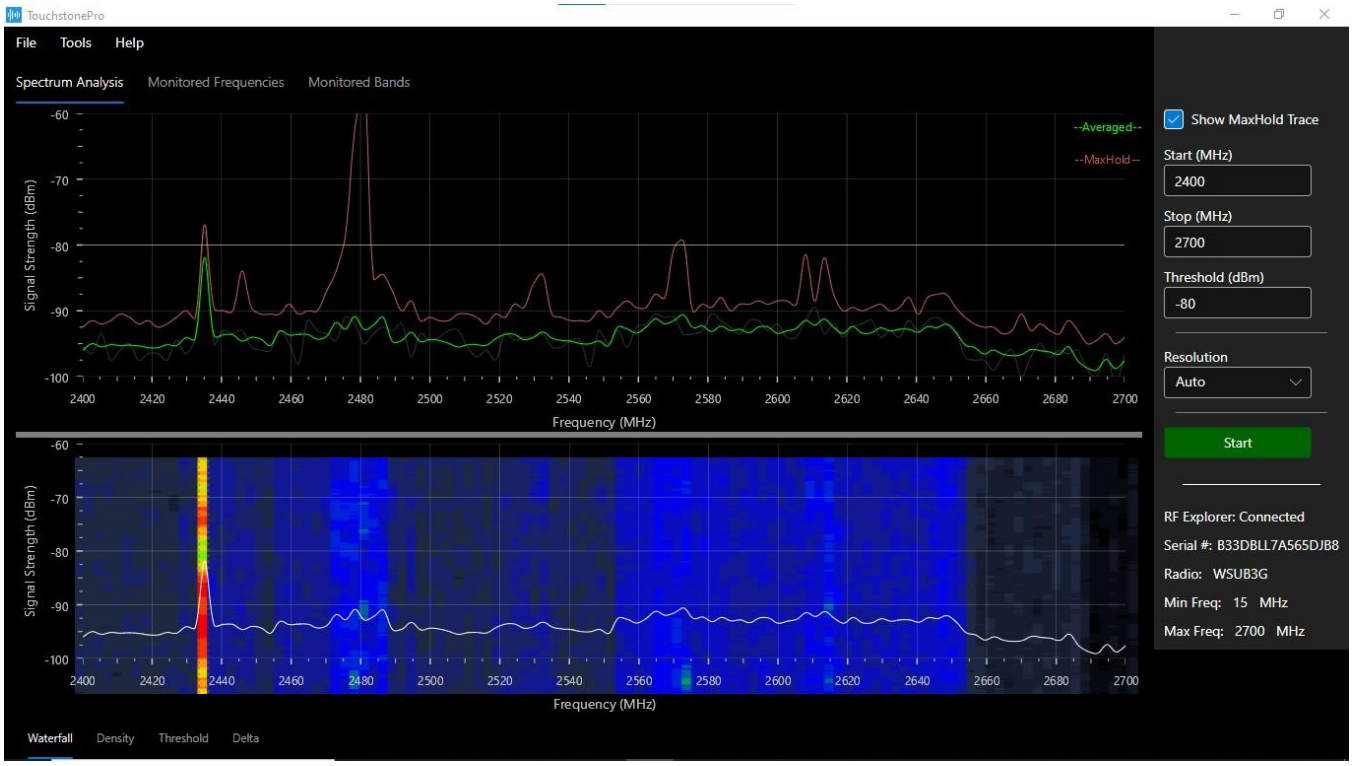
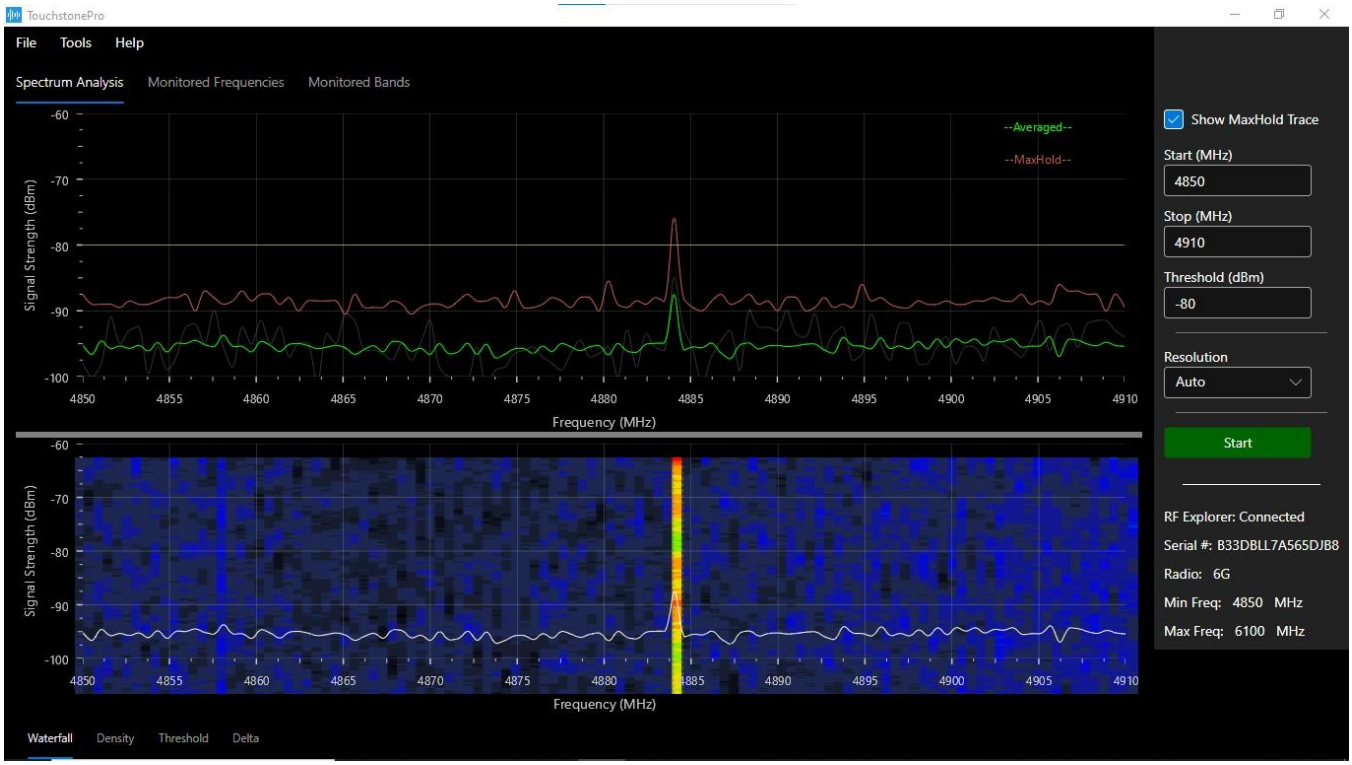
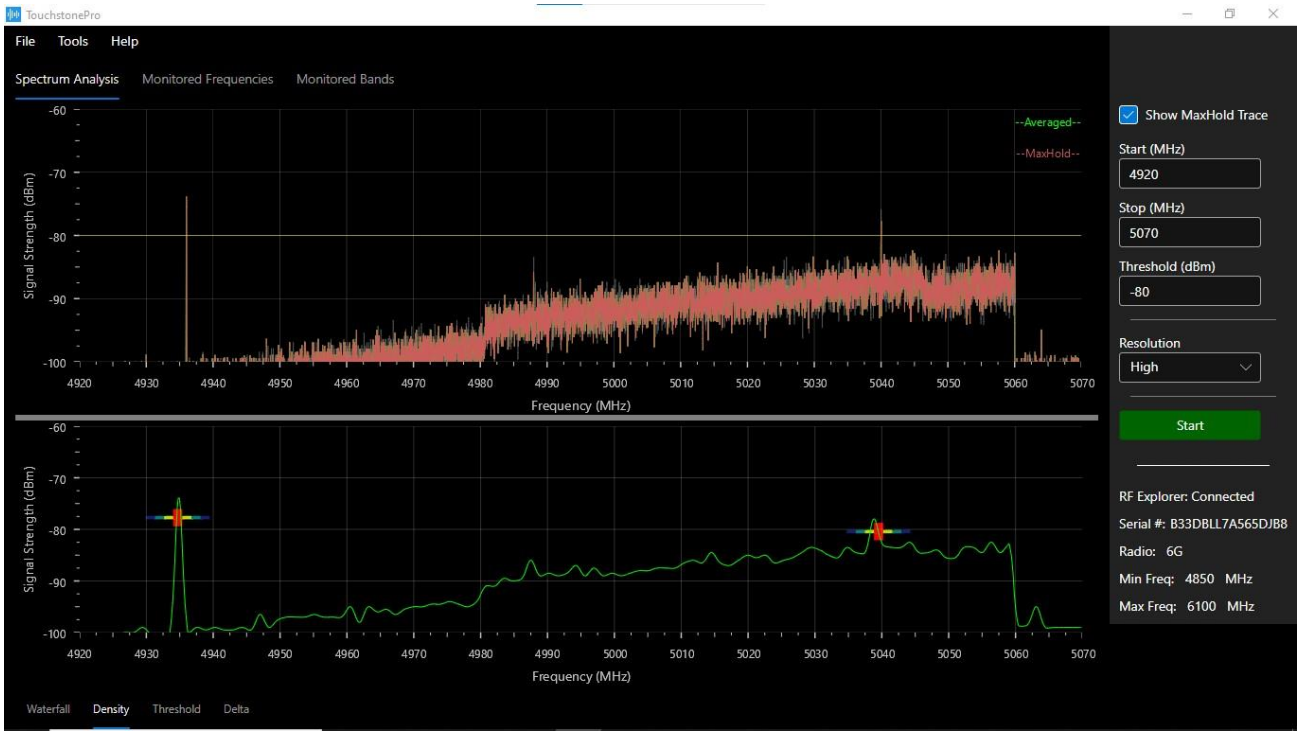
10:41am Image 11



10:52am Image 12



11:04am Image 13



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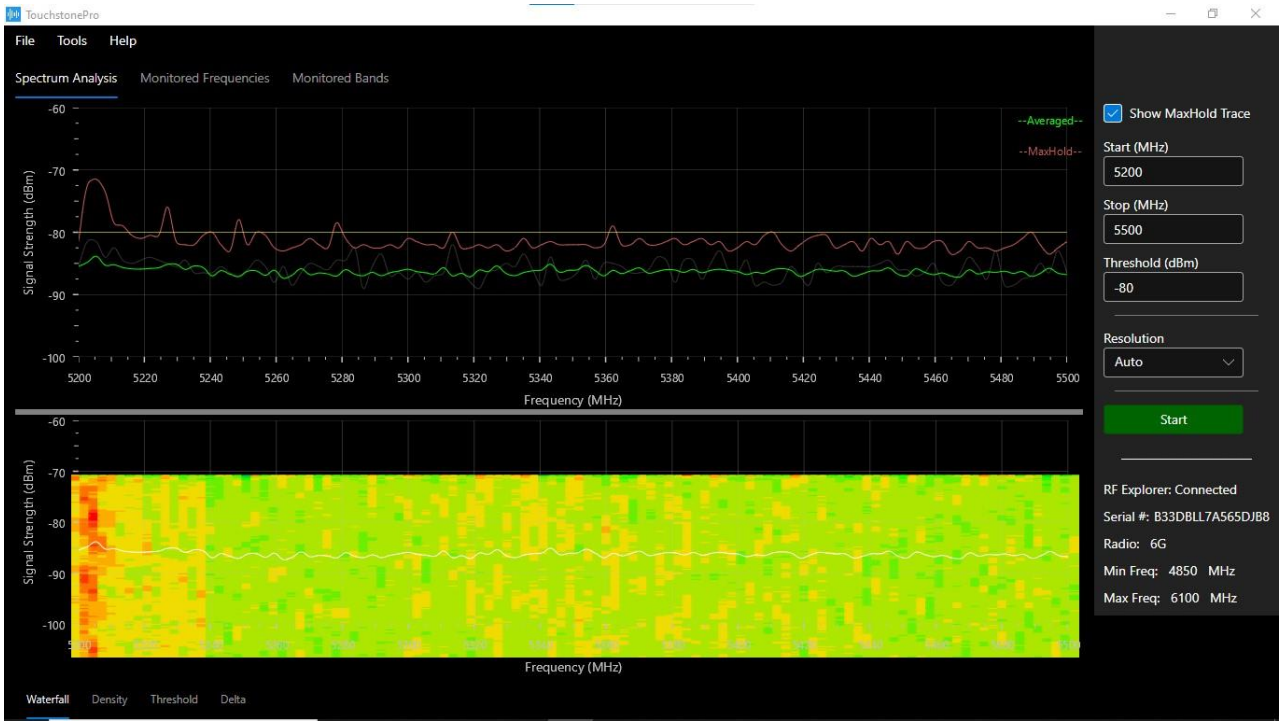
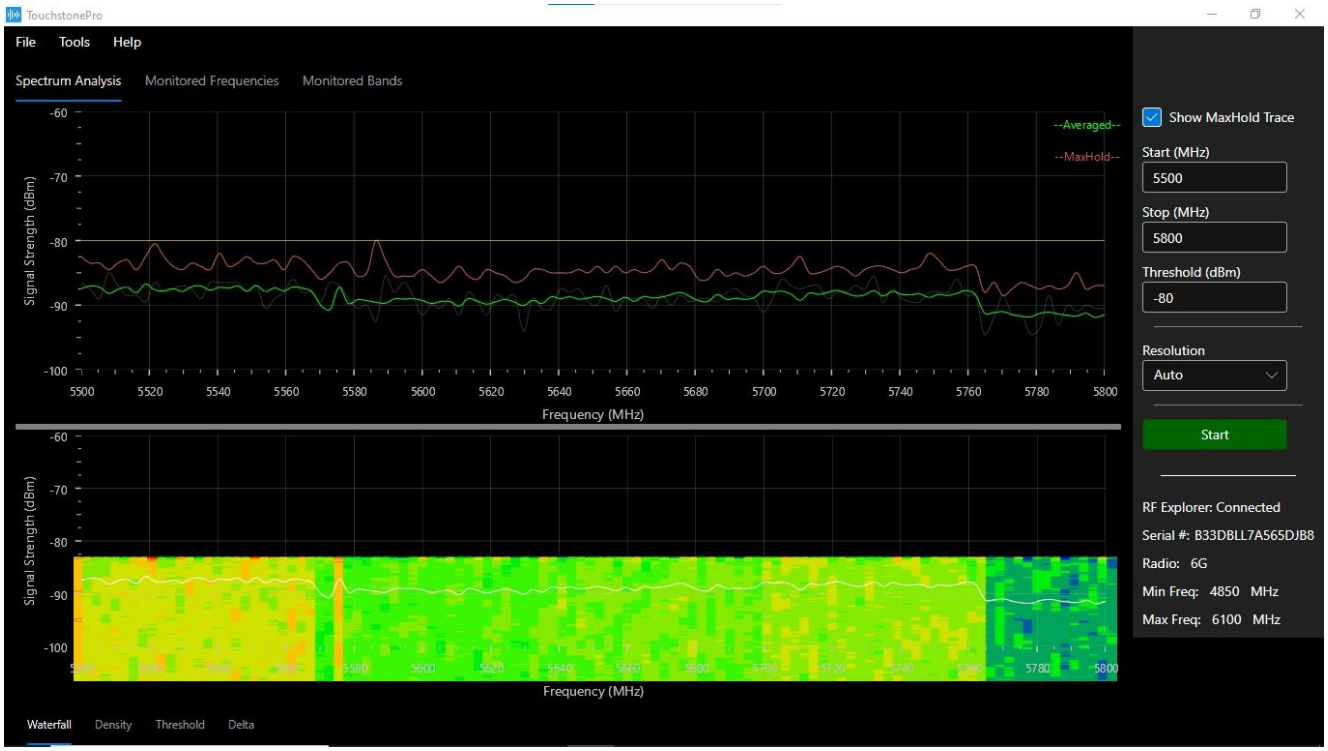
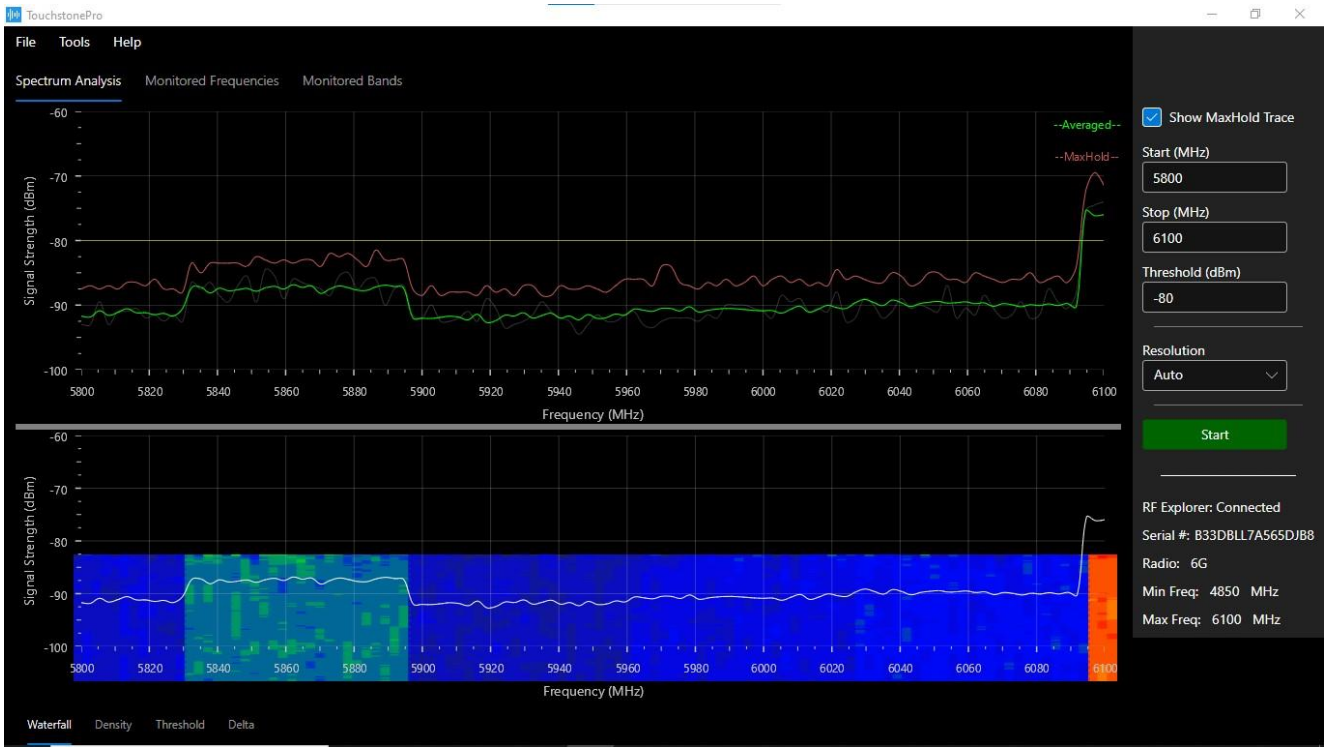


11:15am Image 15



11:23am Image 16



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Homemade Faraday cage/ sleeping area

Another view of Faraday cage

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View of entry door of Faraday cage

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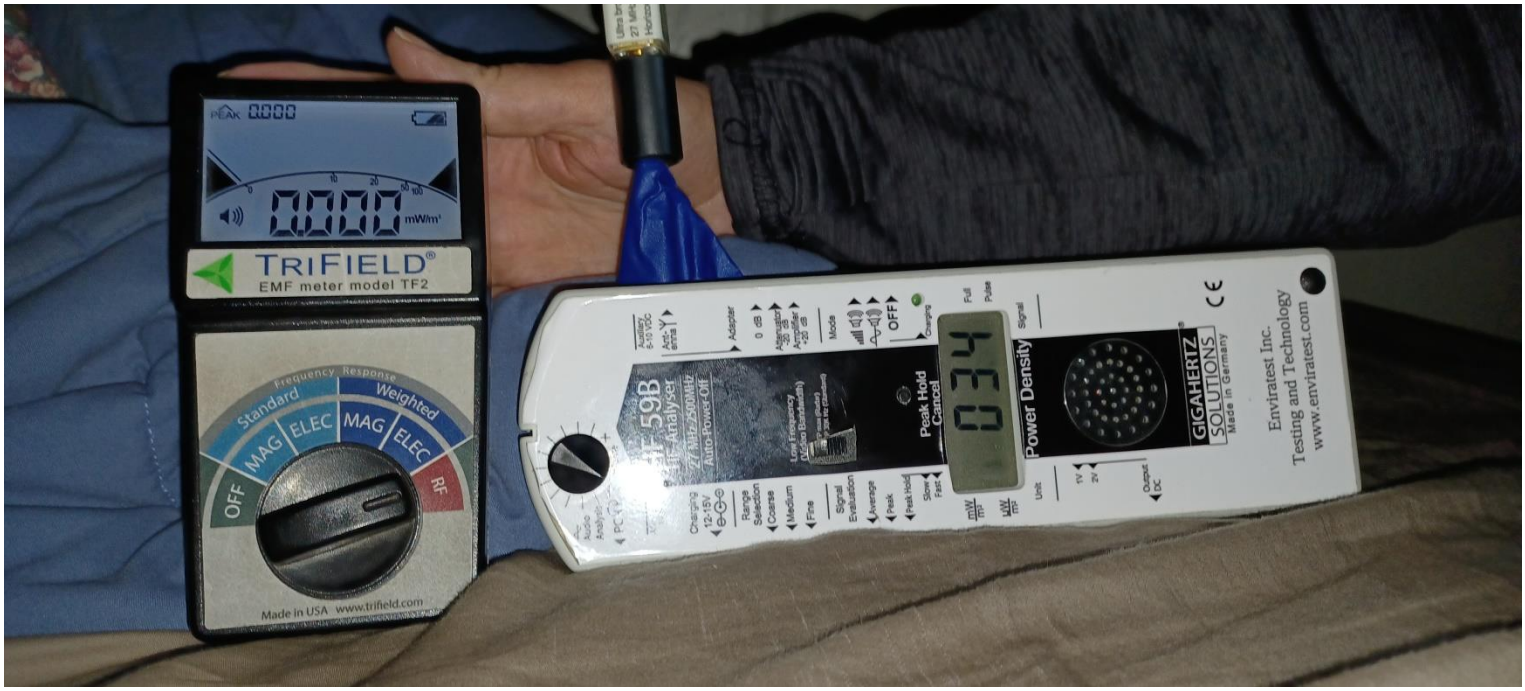
Readings inside Faraday cage taken at Macia Hallers bed

Trifield meter was reading 0; HF59B was reading 4.2 uW (decimal point not visible in picture)

2nd scan Trifield meter was reading 0, HF59B was reading 3.4 uW (decimal point not visible in picture)



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Halller Residence RF Measurement 5/3-6/1/2023 Notes

I arrived at the Haller's property at 3:30pm and was met by Marcia Haller (owner).
I spoke briefly about what I was going to do and then proceeded to setup my table with my meters and laptop computer. I chose the edge of their back yard clearing so as to capture the RF signals from the closest I could get to the tower without having to venture into the woods. This clearing I considered to be part of their useable property and made sense to start recording here.

I setup a wooden TV tray with a boom mount stand attached to the TV tray top. I used double stick tape to position the two meters, a Gigahertz Solutions HF59B with the 3.3MHZ antenna and a RF Explorer 6G Combo spectrum analyzer . The RF Explorer was also connected to my Dell Laptop so as to be able to do the scans on a larger monitor and record the data. That data is in the suppled spreadsheets.

I began running scans at approximately 4:30pm until about 6:30pm (or so). Then Jay Haller came home around 7pm. We talked a bit about my findings and discussed different areas of the yard that he has seen higher readings. He and his wife also showed me their home built Faraday cage. We discussed their sleeping and living habits as well as how things were feeling overall. Marcia remarked that some days are worse that others and on those days she retreats to the "cave" (what they called the faraday cage). She says she starts to feel better even after a few minutes in there.

I measured the RF exposure in there and it was extremely low. Their Trifield meter measured 0mW while my HF59B measured 3.4uW (see pictures)

Jay then helped me take readings from the edge of the clearing and out to the road. We paced our markers at approximately every 20'. We started out at the edge of the clearing and walked towards the road in a straight line (as much as possible). We used the HF59B at 1st because "juggling" the two meters, writing the data down and fending off the bugs was getting to be a challenge. When we reached the edge of the road, we used the Trifield meter and repeated the steps back towards the edge of the clearing closest to the tower.

One of the things I noticed was that at this time, the readings were lower and seemed not as frequent as when I was out at the property back in Oct. 2020. There were some occasional peaks I noticed that were similar to the 2020 measurements (see data spreadsheet).

I also believe a return trip with a high frequency meter capable of measuring the 24-40GHz band is also needs to be done. Currently the new meters to measure this band are just coming to market. As soon as one is available, I will purchase one so I will be able to measure the mm bands that are starting to be deployed.

I attempted some high-resolution scans which gave a more pulsed view of the scan rather the "waveform" look of the lower resolution. This type of scan took much longer due to the scan bandwidth was half of the lower resolution scan. High resolution bandwidth was only 150MHz compared to 300MHz of the lower resolution.

My laptop was put into airplane mode after I logged into the software server to confirm software registration as was my cell phone. I had Marcia Haller turn off or put her phone into airplane mode as well. I did measure a couple of neighbors Wi-Fi routers which is seen in the pictures of my laptop display.

Use of HF59B and the RF Explorer will show that with the HF59B the readings are much higher. This is due to the broad bandwidth this meter captures with, whereas the RF Explorer which is a spectrum analyzer, measures specific bandwidths. This may make it appear that the exposure is minimal where in fact it is quite large. Each bandwidth measured can contain several thousand data points. In the coarse setting the RF Explorer measures a 300 MHz bandwidth and records 112 data points in the high resolution mode the bandwidth is 150 MHz wide and measures 6048 data points. These are the respective peaks of all signals measured.

The scan data measured is in dBM. This was translated to uW or mW readings using an online calculator fr0m a ham radio site https://m0ukd.com/calculators/dbm-dbw-uw-mw-watt-kw-mw-calculator/

I also spoke with both Jay and Marcia to keep using their Trifield meter and logging their measurements, time of day and location as well as a daily log of how Marcia feels. I feel that even though this is what she considers is her “normal” that it is still not acceptable. From what they told me is that they have been sleeping in the faraday cage for two years plus. I was also told that she cannot stay in the house for long period of time or out and about on the property. Marcia is better equipped to go into detail about her condition.

I found both Marcia and Jay Haller very well versed on RF exposure and EHS symptoms. They have taken many precautions in reducing their exposure in their house, around the property and especially with their faraday cage.

This concludes my commentary; the rest of the information is supplied in this report.

Frank DiCristina BBEC, EMRS

6/2/23

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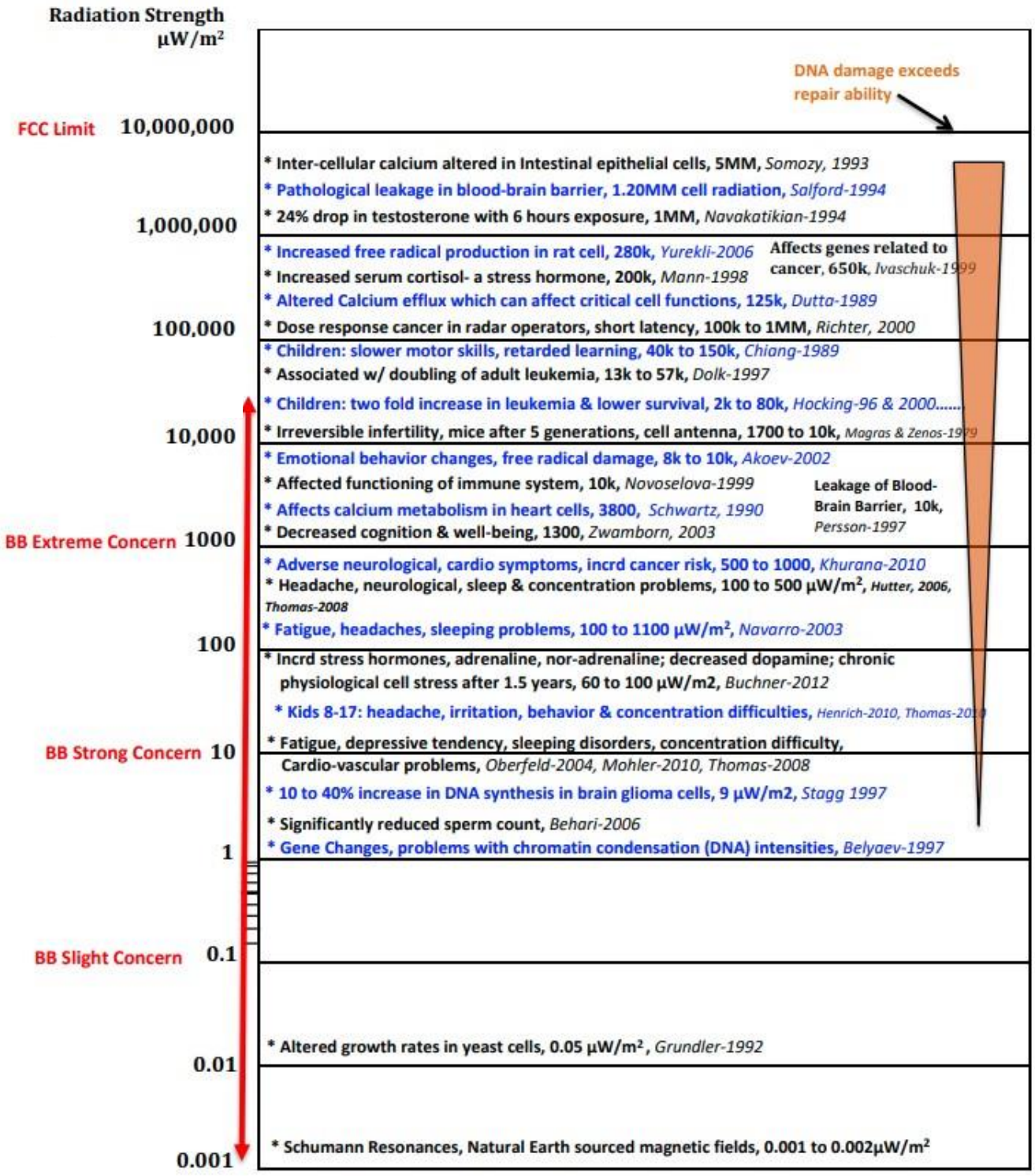
Reported Biological Effects of RF Radiation

For consideration with your physician



BB= Building Biology Guidelines, https://buildingbiologyinstitute.org/wp-content/uploads/2023/03/SBM_2015-v1.pdf

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Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure
(Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

	Power Density (Microwatts/centimeter2 - uW/cm2)		Reference
	As low as (10^{-15}) or 100 femtowatts/cm2	Super-low intensity RFR effects at MW reasonant frequencies resulted in changes in genes; problems with chromatin conformation (DNA)	Belyaev, 1997
	5 picowatts/cm2 (10^{-12})	Changed growth rates in yeast cells	Grundler, 1992
3.4 µW/m²	0.1 nanowatt/cm2 (10^{-10}) or 100 picowatts/cm2	Super-low intensity RFR effects at MW reasonant frequencies resulted in changes in genes; problems with chromatin condensation (DNA) intensities comparable to base stations	Belyaev, 1997
6 µW/m²	0.00034 uW/cm2	Chronic exposure to mobile phone pulsed RF significantly reduced sperm count,	Behari, 2006
	0.0005 uW/cm2	RFR decreased cell proliferation at 960 MHz GSM 217 Hz for 30-min exposure	Velizarov, 1999
	0.0006 - 0.0128 uW/cm2	Fatigue, depressive tendency, sleeping disorders, concentration difficulties, cardio- vascular problems reported with exposure to GSM 900/1800 MHz cell phone signal at base station level exposures.	Oberfeld, 2004
	0.003 - 0.02 uW/cm2	In children and adolescents (8-17 yrs) short-term exposure caused headache, irritation, concentration difficulties in school.	Heinrich, 2010
50 µW/m²	0.003 to 0.05 uW/cm2	In children and adolescents (8-17 yrs) short-term exposure caused conduct problems in school (behavioral problems)	Thomas, 2010
	0.005 uW/cm2	In adults (30-60 yrs) chronic exposure caused sleep disturbances, (but not significantly increased across the entire population)	Mohler, 2010
	0.005 - 0.04 uW/cm2	Adults exposed to short-term cell phone radiation reported headaches, concentration difficulties (differences not significant, but elevated)	Thomas, 2008
100 µW/m²	0.006 - 0.01 uW/cm2	Chronic exposure to base station RF (whole-body) in humans showed increased stress hormones; dopamine levels substantially decreased; higher levels of adrenaline and nor-adrenaline; dose-response seen; produced chronic physiological stress in cells even after 1.5 years.	Buchner, 2012
	0.01 - 0.11 uW/cm2	RFR from cell towers caused fatigue, headaches, sleeping problems	Navarro, 2003

	Power Density (Microwatts/centimeter2 - uW/cm2)		Reference
	0.01 - 0.05 uW/cm2	Adults (18-91 yrs) with short-term exposure to GSM cell phone radiation reported headache, neurological problems, sleep and concentration problems.	Hutter, 2006
	0.005 - 0.04 uW/cm2	Adults exposed to short-term cell phone radiation reported headaches, concentration difficulties (differences not significant, but elevated)	Thomas, 2008
150 µW/m²	0.015 - 0.21 uW/cm2	Adults exposed to short-term GSM 900 radiation reported changes in mental state (e.g., calmness) but limitations of study on language descriptors prevented refined word choices (stupified, zoned-out)	Augner, 2009
	0.05 - 0.1 uW/cm2	RFR linked to adverse neurological, cardio symptoms and cancer risk	Khurana, 2010
500 µW/m²	0.05 - 0.1 uW/cm2	RFR related to headache, concentration and sleeping problems, fatigue	Kundi, 2009
	0.07 - 0.1 uW/cm2	Sperm head abnormalities in mice exposed for 6-months to base station level RF/MW. Sperm head abnormalities occurred in 39% to 46% exposed mice (only 2% in controls) abnormalities was also found to be dose dependent. The implications of the pin-head and banana-shaped sperm head. The occurrence of sperm head observed increase occurrence of sperm head abnormalities on the reproductive health of humans living in close proximity to GSM base stations were discussed."	Otitoloju, 2010
	0.38 uW/cm2	RFR affected calcium metabolism in heart cells	Schwartz, 1990
	0.8 - 10 uW/cm2	RFR caused emotional behavior changes, free-radical damage by super-weak MWs	Akoev, 2002
1600 µW/m²	0.13 uW/cm2	RFR from 3G cell towers decreased cognition, well-being	Zwamborn, 2003
	0.16 uW/cm2	Motor function, memory and attention of school children affected (Latvia)	Kolodynski, 1996
	0.168 - 1.053 uW/cm2	Irreversible infertility in mice after 5 generations of exposure to RFR from an 'antenna park'	Magras & Zenos, 1997
	0.2 - 8 uW/cm2	RFR caused a two-fold increase in leukemia in children	Hocking, 1996
2,000 µW/m²	0.2 - 8 uW/cm2	RFR decreased survival in children with leukemia	Hocking, 2000
	0.21 - 1.28 uW/cm2	Adolescents and adults exposed only 45 min to UMTS cell phone radiation reported increases In headaches.	Riddervold, 2008

Stress proteins, HSP, disrupted immune function	Brain tumors and blood-brain barrier
Reproduction/fertility effects	Sleep, neuron firing rate, EEG, memory, learning, behavior
Oxidative damage/ROS/DNA damage/DNA repair failure	Cancer (other than brain), cell proliferation
Disrupted calcium metabolism	Cardiac, heart muscle, blood-pressure, vascular effects

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Power Density (Microwatts/centimeter2 - uW/cm2)		Reference
0.5 uW/cm2	Significant degeneration of seminiferous epithelium in mice at 2.45 GHz, 30-40 min.	Saunders, 1981
0.5 - 1.0 uW/cm2	Wi-FI level laptop exposure for 4-hr resulted in decrease in sperm viability, DNA fragmentation with sperm samples placed in petri dishes under a laptop connected via WI-FI to the internet.	Avendano, 2012
1.0 uW/cm2	RFR induced pathological leakage of the blood-brain barrier	Persson, 1997
1.0 uW/cm2	RFR caused significant effect on immune function in mice	Fesenko, 1999
1.0 uW/cm2	RFR affected function of the immune system	Novoselova, 1999
1.0 uW/cm2	Short-term (50 min) exposure in electrosensitive patients, caused loss of well-being after GSM and especially UMTS cell phone radiation exposure	Eltiti, 2007
1.3 - 5.7 uW/cm2	RFR associated with a doubling of leukemia in adults	Dolk, 1997
1.25 uW/cm2	RFR exposure affected kidney development in rats (in-utero exposure)	Pyrpasopoulou, 2004
1.5 uW/cm2	RFR reduced memory function in rats	Nittby, 2007
2 uW/cm2	RFR induced double-strand DNA damage in rat brain cells	Kesari, 2008
2.5 uW/cm2	RFR affected calcium concentrations in heart muscle cells	Wolke, 1996
2 - 4 uW/cm2	Altered cell membranes: acetycholine-induced ion channel disruption	D'Inzeo, 1988
4 uW/cm2	RFR caused changes in hippocampus (brain memory and learning)	Tattersall, 2001
4 - 15 uW/cm2	Memory impairment, slowed motor skills and retarded learning in children	Chiang, 1989
5 uW/cm2	RFR caused drop in NK lymphocytes (immune function decreased)	Boscolo, 2001
5.25 uW/cm2	20 minutes of RFR at cell tower frequencies induced cell stress response	Kwee, 2001
5 - 10 uW/cm2	RFR caused impaired nervous system activity	Dumansky, 1974
6 uW/cm2	RFR induced DNA damage in cells	Phillips, 1998

10,000 µW/m²

15,000 µW/m²

20,000 µW/m²

40,000 µW/m²

50,000 µW/m²

Power Density (Microwatts/centimeter2 - uW/cm2)		Reference
8.75 uW/cm2	RFR at 900 MHz for 2-12 hours caused DNA breaks in leukemia cells	Marinelli, 2004
10 uW/cm2	Changes in behavior (avoidance) after 0.5 hour exposure to pulsed RFR	Navakatikian, 1994
10 - 100 uW/cm2	Increased risk in radar operators of cancer; very short latency period; dose response to exposure level of RFR reported.	Richter, 2000
12.5 uW/cm2	RFR caused calcium efflux in cells - can affect many critical cell functions	Dutta, 1989
13.5 uW/cm2	RFR affected human lymphocytes - induced stress response in cells	Sarimov, 2004
20 uW/cm2	Increase in serum cortisol (a stress hormone)	Mann, 1998
28.2 uW/cm2	RFR increased free radical production in rat cells	Yurekli, 2006
37.5 uW/cm2	Immune system effects - elevation of PFC count (antibody producing cells	Veyret, 1991
45 uW/cm2	Pulsed RFR affected serum testosterone levels in mice	Forgacs, 2006
50 uW/cm2	Cell phone RFR caused a pathological leakage of the blood-brain barrier in 1 hour	Salford, 2003
50 uW/cm2	An 18% reduction in REM sleep (important to memory and learning functions)	Mann, 1996
60 uW/cm2	RFR caused structural changes in cells of mouse embryos	Somozy, 1991
60 uW/cm2	Pulsed RFR affected immune function in white blood cells	Stankiewicz, 2006
60 uW/cm2	Cortex of the brain was activated by 15 minutes of 902 MHz cell phone	Lebedeva, 2000
65 uW/cm2	RFR affected genes related to cancer	Ivaschuk, 1999
92.5 uW/cm2	RFR caused genetic changes in human white blood cells	Belyaev, 2005
100 uW/cm2	Changes in immune function	Elekes, 1996
100 uW/cm2	A 24.3% drop in testosterone after 6 hours of CW RFR exposure	Navakatikian, 1994
120 uW/cm2	A pathological leakage in the blood-brain barrier with 915 MHz cell RF	Salford, 1994

100,000 µW/m²

200,000 µW/m²

500,000 µW/m²

600,000 µW/m²

1,000,000 µW/m²

Power Density (Microwatts/centimeter2 - uW/cm2)		Reference
500 uW/cm2	Intestinal epithelial cells exposed to 2.45 GHz pulsed at 16 Hz showed changes in intercellular calcium.	Somozy, 1993
500 uW/cm2	A 24.6% drop in testosterone and 23.2% drop in insulin after 12 hrs of pulsed RFR exposure.	Navakatikian, 1994

5,000,000 µW/m²

STANDARDS		
530 - 600 uW/cm2	Limit for uncontrolled public exposure to 800-900 MHz	ANSI/IEEE and FCC
1000 uW/cm2	PCS STANDARD for public exposure (as of September 1,1997)	FCC, 1996
5000 uW/cm2	PCS STANDARD for occupational exposure (as of September 1, 1997)	FCC, 1996
BACKGROUND LEVELS		
0.003 uW/cm2	Background RF levels in US cities and suburbs in the 1990s	Mantiply, 1997
0.05 uW/cm2	Median ambient power density in cities in Sweden (30-2000 MHz)	Hamnierius, 2000
0.1 - 10 uW/cm2	Ambient power density within 100-200' of cell site in US (data from 2000)	Sage, 2000

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The TriField EMF Meter Model TF2 is an AC gaussmeter, AC electric field meter, and radio power density meter in a single unit, that combines all the features needed for fast, accurate measurements of electromagnetic fields (EMF). In addition to standard AC measurement modes, a special frequency weighted mode will properly scale the magnetic and electric measurements to indicate the full magnitude of currents produced by each type of field inside the human body.

Features:

- Detects all three types of EMF pollution: AC magnetic, AC electric, and RF/microwave
- Special frequency weighting mode for measuring electric current from EMF in the human body
- AC Magnetic Mode covers 40 Hz – 100 kHz with range of 0.1 – 100.0 milligauss (mG)
- AC Electric Mode covers 40 Hz – 100 kHz with range of 1 – 1000 volts per meter (V/m)
- RF Mode covers 20 MHz – 6 GHz with range of 0.001 – 19.999 milliwatts per square meter (mW/m2)
- AC magnetic measurements are 3-axis, allowing for quick readings, regardless of meter orientation
- Large liquid-crystal display (LCD) for crystal clear, accurate readings
- Adjustable backlight for use in low-light environments
- Audio Indicator emits sound that helps to pinpoint EMF sources
- Peak Hold captures fast pulses, for measuring fast digital signals
- Operates for more than 20 hours on a 9V battery, with a low battery indicator

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Technical specifications:

Frequency Range:	27 Mhz to 3.3 Ghz
Measurement range 1:	Fine: 0.01 to 19.99 µW/m² ~ – 70 dBm
Measurement range 2:	Medium: 0.1 – 199.9 µW/m² ~ – 60 dBm
Measurement range 3:	Course: 10 – 19,999 µW/m² ~ – 50 dBm
Attenuation:	Modules available to extend the scales in increments of 20db
Antennas:	HF59B comes with standard true logarithmic periodic antenna 800 Mhz to 3.3 Ghz. HFE59B Meter Kit also includes UBB27 Omnidirectional / Isotropic 360 degree antenna 27 Mhz to 3.3 Ghz. Both are horizontally and vertically polarized and polarized for improved h/v decoupling and minimized ripple. Compensated log./per. antenna for signals under 800 Mhz
Signal Evaluation:	True Peak and Average
Accuracy:	+ / – 3.0 dB
Linearity Deviation:	+ / – 3.0 dB
Rollover:	+ / – 5 digits
Dimensions:	71 x 225 x 31 mm (W x L x H) approx 2–3/4 x 9 x 1.25 inches
Weight:	Approx. 270 grams
Case Material:	Plastic

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RF Explorer 6G Combo

Compliance
All RF Explorer models are complaint with FCC as well as CE regulations.
All RF Explorer Wideband models have been certified under EN/IEC61236 and EN/IEC61000.
All RF Explorer models are RoHS compliant

Wide band coverage to all popular RF frequencies, starting at 15MHz and going up to 2.7GHz, as well as 4.85-6.1GHz. This include very interesting frequency areas such as 2m HAM radio, all VHF and UHF, FM radio, GPS, WiFi and WiMax, Bluetooth, etc.
Frequency band: 15-2700 MHz and 4850-6100MHz
Frequency span:
Left SMA port (6G): 2-600Mhz
Right SMA port (WSUB3G): 112KHz - 600MHz
Left SMA port (6G): 4850-6100MHz
Right SMA port (WSUB3G): 15-2700 MHz
Amplitude resolution: 0.5dBm
Dynamic range:
Left SMA port (6G): -105dBm to -15dBm
Right SMA port (WSUB3G): -110dBm to -10dBm
Absolute Max input power:
Left SMA port (6G): +25dBm
Right SMA port (WSUB3G): +30dBm
Average noise level (typical): -105dBm
Frequency stability and accuracy (typical):
Left SMA port (6G): +-0.5ppm
Right SMA port (WSUB3G): +-10ppm
Amplitude stability and accuracy (typical):
Left SMA port (6G): +-3dBm
Right SMA port (WSUB3G): +-6dBm
Frequency resolution: 1Khz ?
Resolution bandwidth (RBW):
Left SMA port (6G): automatic 58Khz to 812Khz
Right SMA port (WSUB3G): automatic 3Khz to 600Khz

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Touchstone-Pro

RF Spectrum Analyzer Software for RF Explorer

Touchstone-Pro software turns data collected from RF Explorer spectrum analyzers into highly graphical charts and displays, enabling users to more readily visualize the RF environment, monitor RF signals, troubleshoot RF issues, and detect sources of RF interference.

In addition to running as a standalone, handheld device, RF Explorer can be connected to a PC where software (e.g. Touchstone) is used to provide enhanced functionality and data analysis. The connection is made using a mini USB cable. (NOTE: A high quality USB cable should be used in order to limit EMC interference from the PC that could influence your measurements.)

Touchstone-Pro runs natively under Windows and MacOS architectures -- both Intel x64 and Apple Silicon (M1/M2). When you register a license key it becomes associated with the serial number (S/N) of a specific RF Explorer device and NOT a machine. As a result, you can install the Windows and MacOS software on as many machines as you like.

Touchstone-Pro offers a variety of diagnostic views of the data captured by the RF Explorer device. Employing multiple views of the data enhances your ability to gain a better understanding of the local, RF landscape.

The RF Explorer hand-held spectrum analyzer is an amazing and unique device. Combined with **Touchstone-Pro** software you now have an RF diagnostic tool unmatched in price and performance. Armed with the ability to monitor RF signals, detect RF interference and view all RF activity that occurs in your environment, solving wireless problems.

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Education, training and Job experience:

Sewanhaka Vocational High School
Electronics

Red Wing Technical College
Electronic Technology

Efcor Industries
Industrial and maintenance mechanic

Fairchild Republic Aviation (A10 tank support plane)
Cockpit and control panel test technician

Allen Avionics (RF Filter manufacture)
Electronic test technician

Automotive Technology (mobile electronics)
Alarm and cell phone installation technician

Fieldworks/Kontron (Industrial/ Military computers)
Engineering, repair, test technician
Field service technician and field service training instructor

Institute of Building Biology
Certified Building Biology and Ecology Consultant 2013
Electromagnetic Radiation Specialist 2015
Advanced Electromagnetic instructor 2010 and 2011
Program Director 2010-2012

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