

Evidence for increased autism due to electromagnetic pollution from high power high gain microwave antennas

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Abstract

Electromagnetic pollution from man-made sources has increased exponentially over the past century. This paper explores the hypothesis that a significant percentage of increased autism rates since the early 1900s is primarily due to man-made sources of electromagnetic radiation inducted and conducted into humans from the atmosphere. This study looks at one autism cluster near Santa Monica, CA.

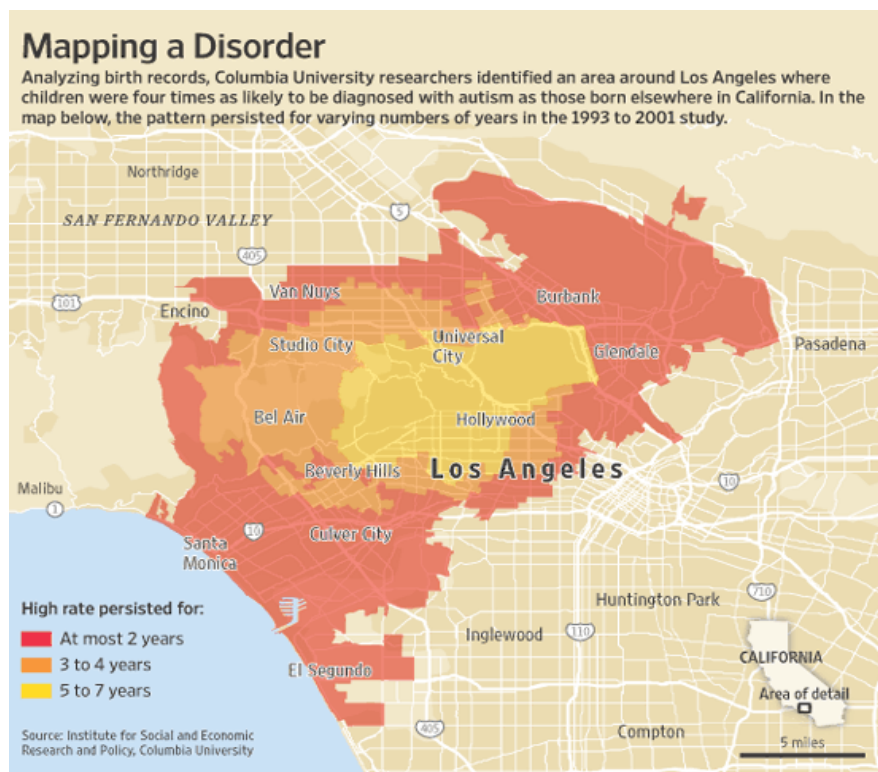


Figure 1: Autism Cluster Identified in Santa Monica, California area by Columbia Researchers [11]

Discussion

For many years autism was rare - occurring in just five children out of 10,000. However, since the early 1990s, the rate of autism has increased dramatically around the world, with figures as high as 60 per 10,000. In March, 2012, the US Federal Centers for Disease Control that 1 in 88 children in the US is diagnosed with an Autism Spectrum Disorder (ASD) [1].

Autism is a severe developmental disorder that begins within the first three years after conception. Most autistic children look like other kids, but do puzzling and disturbing things which are markedly different behaviors from those of typical children. In less severe cases on the spectrum (Pervasive

Developmental Disorder (PDD) or Asperger's Syndrome), children usually have speech and might even be intellectually gifted, but they have one or more "autistic" social and behavioral problems [1].

Broadcasting is the distribution of audio and/or video content to a dispersed audience via any electronic mass communications medium, but typically one using the electromagnetic spectrum (radio waves), in a one-to-many model.[2] Broadcasting began with AM radio broadcasting which came into popular use starting with the invention of the crystal detector in 1906. Before this, all forms of electronic communication, radio, telephone, and telegraph, were "one-to-one", with the message intended for a single recipient. The term "broadcasting", borrowed from the agricultural method of sowing seeds in a field by casting them broadly about,[3] was coined by either KDKA manager Frank Conrad or RCA historian George Clark[4] around 1920 to distinguish this new activity of "one-to-many" communication; a single radio station transmitting to multiple listeners.

Over the air Broadcasting is usually associated with radio and television, though in practice radio and television transmissions take place using both wires and radio waves. The receiving parties may include the general public or a relatively small subset; the point is that anyone with the appropriate receiving technology can receive the signal. The field of broadcasting includes a wide range of practices, from relatively private exchanges such as public radio, community radio and commercial radio, public television, and commercial television.



Figure 2: Typical Broadcast Antenna Farm of high gain satellite broadcast transmitters and receivers

Microwave antenna radiation can undergo "anomalous propagation" due to atmospheric weather changes. Anomalous propagation (sometimes shortened to Anoprop) includes different forms of electromagnetic (EM) wave propagation that are not encountered in a standard atmosphere due to a non-standard distribution of temperature and humidity with height in the atmosphere.[5] While technically the term includes propagation with larger losses than in standard atmosphere, in practical

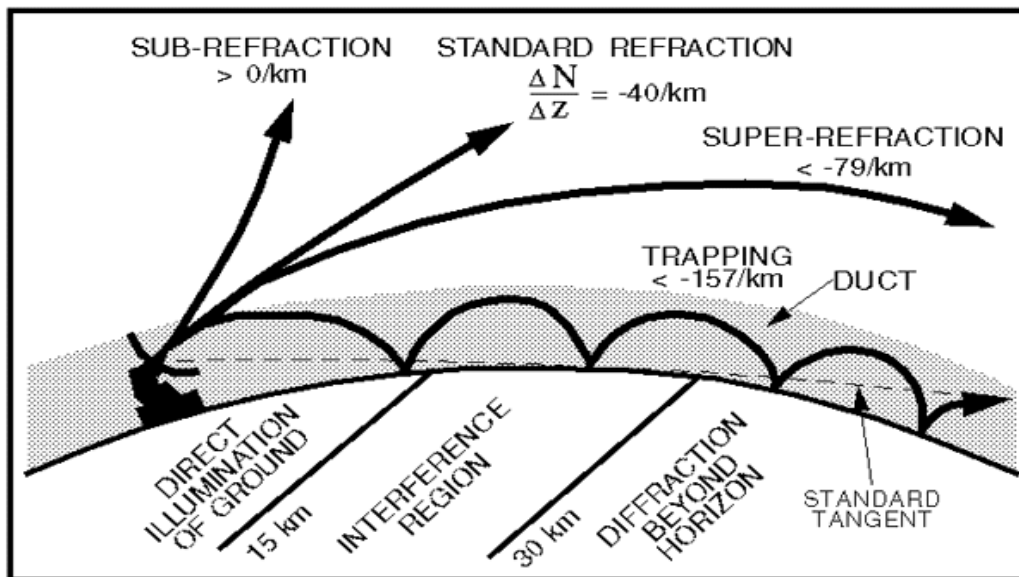
applications it is most often meant to refer to cases when signal propagates beyond normal radio horizon.

It is very common to have temperature inversions forming near the ground, for instance air cooling at night while remaining warm aloft [6]. This happens equally aloft when a warm and dry air mass overrides a cooler one, like in the subsidence aloft cause by a high pressure intensifying. The index of refraction of air increases in both cases and the EM wave bends toward the ground instead of continuing upward. This is known as super refraction

On surface-base inversion, the beam will eventually hit the ground and a part of it can be reflected back toward the emitter. In upper air inversion, the bending will be limited to the layer involved but the bending will extend the path of the beam, possibly beyond the usual transmission horizon.

Ducting is the extreme of this problem is when the inversion is very strong and shallow, the EM wave is trapped within the inversion layer. The beam will bounce many times inside the layer as within a waveguide. In surface-based ducting, the beam will hit the ground many times, causing return echoes at regular distances toward the emitter. In elevated ducts, the transmission can be extended to very large distances.

A picture of different radar propagation regimes. Normal propagation is found with refractivity gradient about -40 units/km; ducting has lower gradient than -157 units/km.



AP clutter return is affected by grazing angle, dN/dz , duct height, wavelength, and polarization.

Figure 3: Microwave Radars and Earth station beams undergo super refraction, trapping and ducting from the atmosphere, sometimes irradiating the ground [7]

Electromagnetic radiation is among the many hypotheses for causes of increased autism. It is generally accepted in the scientific community that radiofrequency (RF) radiation is a biologically active

substance. It is also readily acknowledged that human exposures to RF radiation have become pervasive during the past 20 years, whereas such exposures were uncommon prior to that time. It is suggested that fetal or neo-natal exposures to RF radiation may be associated with an increased incidence of autism [8].

Although autism spectrum conditions (ASCs) are defined behaviorally, they also involve multileveled disturbances of underlying biology that find striking parallels in the physiological impacts of electromagnetic frequency and radiofrequency exposures (EMF/RFR) [9]. Many studies of people with ASCs have identified oxidative stress and evidence of free radical damage, cellular stress proteins, and deficiencies of antioxidants such as glutathione. Elevated intracellular calcium in ASCs may be due to genetics or may be downstream of inflammation or environmental exposures. Cell membrane lipids may be peroxidized, mitochondria may be dysfunctional, and various kinds of immune system disturbances are common. Brain oxidative stress and inflammation as well as measures consistent with blood–brain barrier and brain perfusion compromise have been documented. Behaviors in ASCs may emerge from alterations of electrophysiological oscillatory synchronization, EMF/RFR could contribute to these by detuning the organism, and policy implications of these vulnerabilities [10]. Changes in brain and autonomic nervous system electrophysiological function and sensory processing predominate, seizures are common, and sleep disruption is close to universal. All of these phenomena also occur with EMF/RFR exposure that can add to system overload ('allostatic load') in ASCs by increasing risk, and worsening challenging biological problems and symptoms; conversely, reducing exposure might ameliorate symptoms of ASCs by reducing obstruction of physiological repair. Various vital but vulnerable mechanisms such as calcium channels may be disrupted by environmental agents, various genes associated with autism or the interaction of both. With dramatic increases in reported ASCs that are coincident in time with the deployment of wireless technologies, we need aggressive investigation of potential ASC – EMF/RFR links. The evidence is sufficient to warrant new public exposure standards benchmarked to low-intensity (non-thermal) exposure levels now known to be biologically disruptive, and strong, interim precautionary practices are advocated.

High-risk clusters of autism based on residence at birth in California for children born from 1993 through 2001 were determined in a study published in 2010 [11]. These clusters are geographically stable. Children born in a primary cluster are at four times greater risk for autism than children living in other parts of the state. This is comparable to the difference between males and females and twice the risk estimated for maternal age over 40. In every year roughly 3% of the new caseload of autism in California arises from the primary cluster identified – a small zone 20km by 50km. The identification of robust spatial clusters indicates that autism does not arise from a global treatment and indicates that important drivers of increased autism prevalence are located at the local level.

The Santa Monica area autism cluster graphic shown from Figure 1 was overlaid in Google Earth™. The graphic was scaled to fit. In addition to spatial mapping, Google Earth™ allows one to look at 3-D terrain curvature and other features of the terrain that may influence propagation of electromagnetic radiation. Figure 4 below shows that same graphic with the addition of high power, high gain pulsed microwave radars, primarily located at airports as well as high gain satellite broadcast earth station antennas [12].

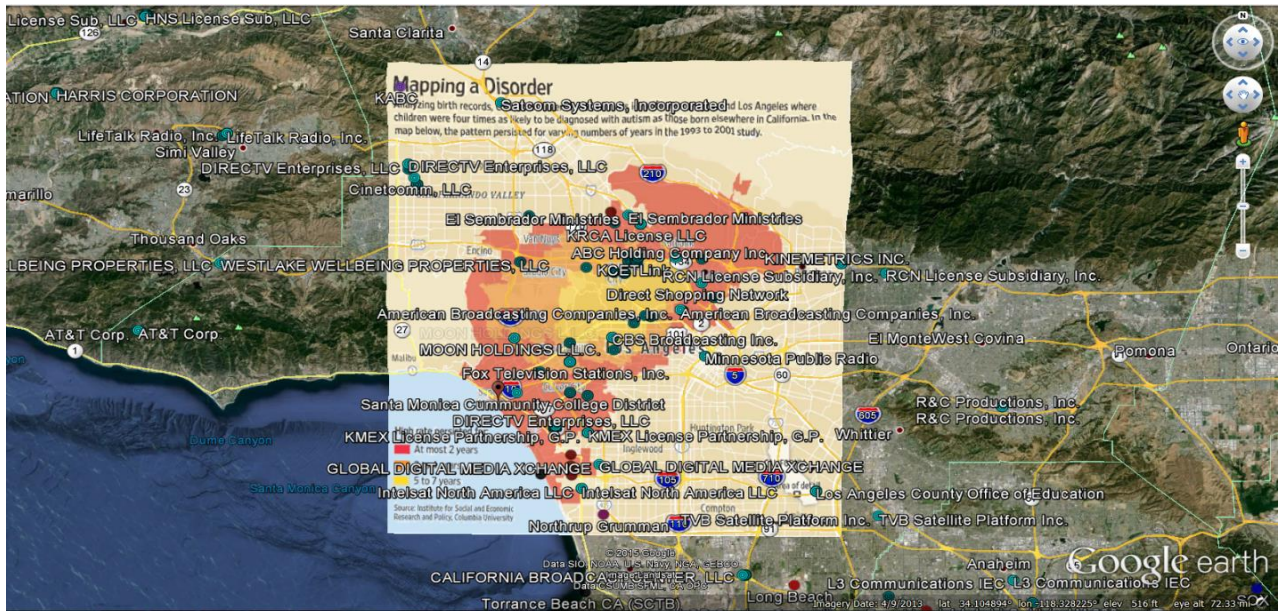


Figure 4

One can quickly see the autism cluster lines up well with the highest density of microwave radars and broadcast earth stations in the Los Angeles area. In fact this area of California is known as the “Entertainment Capital of the World” [13] and has the highest density of broadcast antennas compared to the rest of the US. Figure 2 does not show all of the antennas in the area, one has to explode them in Google Earth™ to see that. Figure 5 below shows an exploded view of most of the antennas in the area.

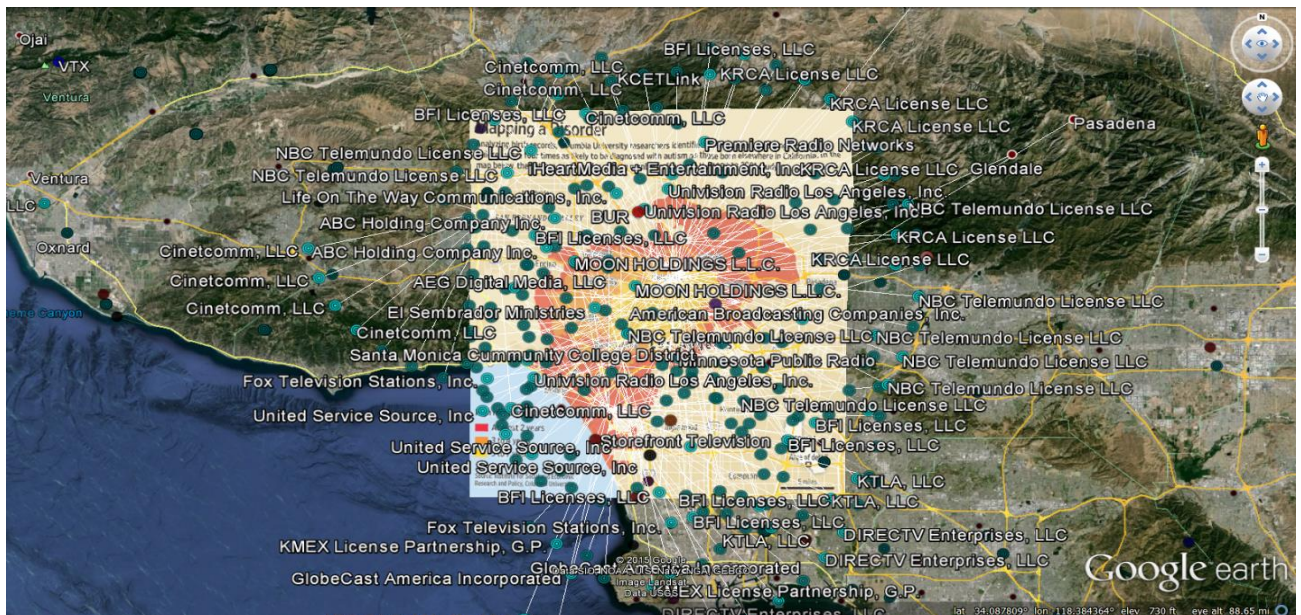


Figure 5

It can be seen in figure 6 below that the elevated areas of the Hollywood area hillsides appears to be at the center of the cluster. If electromagnetic radiation is a strong inducer of autism, it would be expected the exposed hillsides (higher elevation areas) in the region would have higher rates of autism

due to their exposure both from above and the sides. That area of California also has three very busy airports: Los Angeles International Airport, Santa Monica Airport and Bob Hope Burbank Airport which could trigger more reflection of radiation off metal aircraft fuselages and wings overhead.

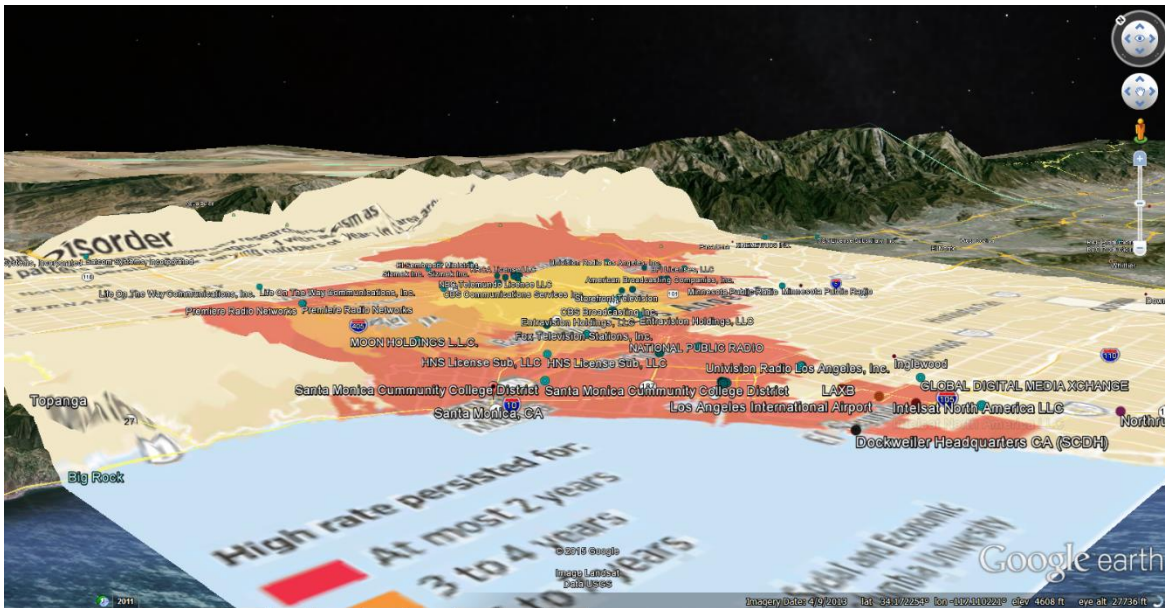


Figure 6

Figure 7 below shows an exploded view in 3-D of the microwave radars and earth stations in the area of the autism cluster.

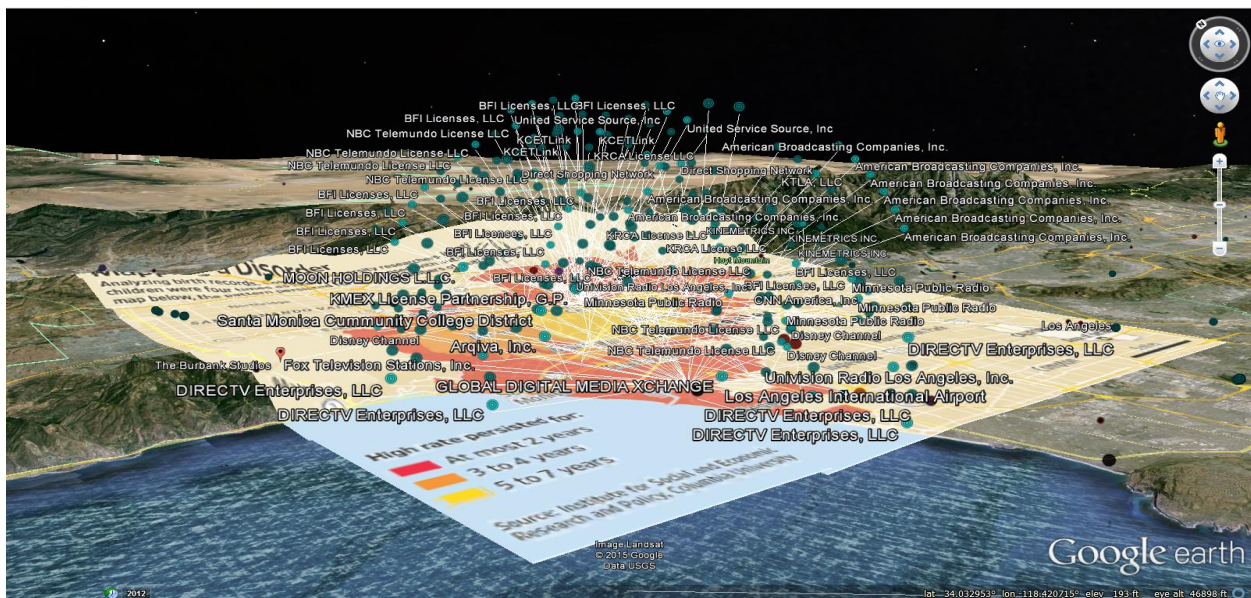


Figure 7: High Concentration of microwave earth station transmitters and radars lines up perfectly with the autism cluster

As a comparison, as shown in Figure 11 below, I have drawn an orange box in Google Earth™ around the autism cluster. I count 224 high gain, high power microwave radars and lower power, high gain earth stations in the area of the orange box which encases the autism cluster. If I draw the same size box shown in red below, over Southern Los Angeles, outside the cluster, I count 48 microwave earth stations and radars. So in general, there is a 466% increase in microwave radiation in an area of 400% autism increase from the Columbia University study.

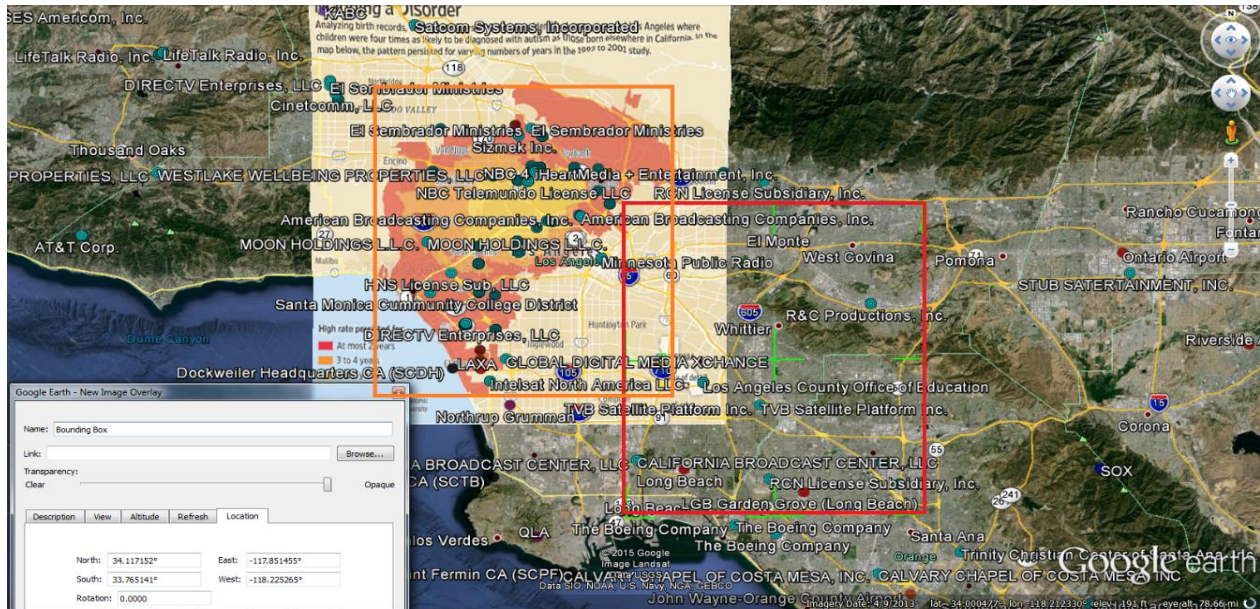


Figure 8

As an example of possible causation, in Figure 12 below I have listed standard antenna power density calculations for one location in the cluster with 14 high gain microwave transmitters.

Radar/Call Sign	Model	Power (Watts)	Gain (dBi)	EIRP (Watts)
ACME Television Stations, Inc.	ES93HS	63.1	50.5	112,202
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ACME Television Stations, Inc.	ES93HS	63.1	50.5	112,202
ACME Television Stations, Inc.	ES93HS	63.1	53.9	245,471
ACME Television Stations, Inc.	ES93HS	126.2	50.5	112,202
ACME Television Stations, Inc.	ES93HS	126.2	53.9	245,471
ACME Television Stations, Inc.	ES73-NH1	224.5	48.5	70,795
ACME Television Stations, Inc.	ES73-NH1	224.5	51.5	141,254
Totals		1332.4	53.2	2,358,087

Figure 9: That is a fictitious company name

You can see in figure 13 below that 14 overlapping antenna beams super refracting off a 2000 ft. high inversion in the overhead atmosphere and ducting back to ground could exceed the FCC safe limit on uncontrolled radiation up to 7806 feet away along the path of the overlapping antennas [15]. This is just an example as there are approx. 224 antennas in the area and many possible combinations could exist depending upon atmospheric conditions.

Amateur Radio RF Safety Calculator

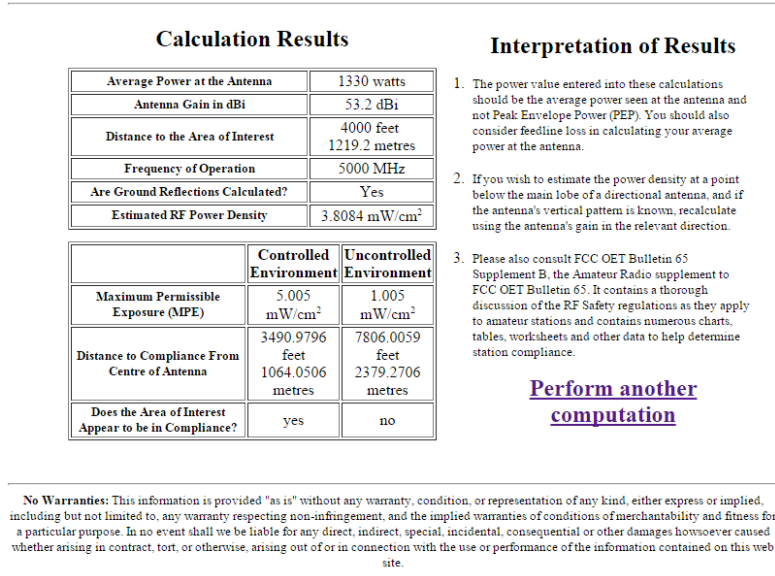


Figure 10: Standard antenna power density calculations [19]

Conclusions

Due to the fact the Santa Monica area autism cluster lines up very well with the highest power density of high gain microwave radiation in the overhead atmosphere of any cities in California, it is the author's strong opinion that this should be investigated without delay. That autism cluster area has three very busy airports and electromagnetic radiation will also reflect highly off overhead metal fuselages and wings of airplanes in addition to the additional radars and antennas installed on airplanes. Inversions in the atmosphere that lead to super refraction and ducting of electromagnetic radiation are also very common along coastal areas, like Santa Monica. Power Density of radiation striking the surrounding area will be highest during strong weather, fog and precipitation events when Doppler weather radar reflectivity is highest. Increased autism rates have already been linked with increased precipitation [16] as well as air pollution [17], which could both increase reflected and refracted terrestrial radiation back to the local surroundings. Autism was also recently linked to environmental pollutants and childhood genetic mutations as well [18].

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Revision 2: 11/11/15

About The Author

The author is a career chemical engineer (29 years) and is employed by a top 10 International Engineering, Environmental and Construction Company and is based in Atlanta, GA. He enjoys tennis,

coaching kids' sports and the outdoors. I have performed this research on my own time and cost over the past 3 years. My research is not affiliated or influenced by any company or government agency.

Credits:

I give all of the credit for the causative damage from EMF to the many researchers over the past decades. My research is purely looking for spatial and temporal correlations between RF/microwave transmission sources and autism clusters

A license was obtained for the use of the autism cluster graphic overlaid in Google Earth. All credit to Columbia University and the researchers.

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