RADIOFREQUENCY (RF) MONITORING SUMMARY REPORT

Prepared by:

URS

12120 Shamrock Plaza
Suite 300
Omaha, NE 68154

URS Job Project Number: 29406266

Prepared for:

Los Angeles Unified School District
Office of Environmental Health and Safety
333 South Beaudry Avenue, 28th Floor
Los Angeles, California 90017

TABLE OF CONTENTS

TABLE OF CONTENTS

Tables

This Radiofrequency (RF) Monitoring Summary Report was prepared by URS Corporation (URS) for the Los Angeles Unified School District (LAUSD). This report presents a series of evaluations of Radiofrequency (RF) exposures associated with existing and planned WiFi installations. This report includes results of a variety of RF exposure scenarios including:

- WLANs, tablet, laptops use during teacher in-service training at Valley Academy of the Arts and Science, August 5, 6 and 7, 2013
- WLANs and student classroom tablet use at Cesar E. Chavez Learning Academy ARTES, August 26, 2013
- WLANs and student classroom tablet use at Cimarron Avenue School, October 29, 2013
- WLANs and student classroom tablet use at Harte Prep Middle School, October 29, 2013
- WLANs and student classroom tablet use at Diego Rivera Learning Complex, November 15, 2013
- WLANs and student classroom tablet use at Animo Westside Charter Middle School, February 13, 2014
- WLANs and student classroom tablet use at Paul Revere Middle School, February 13, 2014
- WLANs and student classroom tablet use at 54th Street School, February 27, 2014
- WLANs and student classroom tablet use at YES Academy, February 27, 2014
- WLANs and student classroom tablet use at Ambler Avenue School, March 20, 2014
- WLANs and student classroom tablet use at Rancho Dominguez Preparatory School, March 20, 2014

Results of the RF monitoring study showed all of the average power density results were below the LAUSD cautionary level of 0.1 microwatts per square centimeter ($\mu W/cm^2$) for time-averaged, whole body exposure.

It is important to note that all the measured field strengths were collected while students were actively using their tablet devices and did not include time intervals when the devices were not in use. Based upon the results of this study, URS believes that similar results below the LAUSD cautionary level would be expected in all classroom settings utilizing similar equipment and WiFi configurations.

The following presents a description of the monitoring protocol and results of the RF monitoring study.

2.1 DURATION OF MONITORING EVENTS

Total duration of monitoring varied in response to tablet usage. These durations provided conservative results by including only activities involving the students downloading or running applications from the internet. The times when students were not using their tablets were not included in the evaluation.

2.1.1 Monitoring Equipment

The monitoring was conducted utilizing the Narda Selective Radiation Meter Model 3006 (SRM 3006). The SRM 3006 was used to perform narrowband spectral analysis of application and individual classroom RF transmissions associated with the use of tablets and access points (APs) across designated frequencies of 2 to 5 gigahertz (GHz).

2.1.2 Monitoring Distances

Initial application and equipment measurements were taken to identify field strengths associated with specific applications at distances of one inch, one foot, three feet, and six feet. Classroom measurements were taken predominantly at the users interface (desk level). Additional measurements were collected to the front, back and, between users of the tablet devices. Distances from the APs were also measured, locating their highest field strengths. The distance with the highest response in each classroom was included in the evaluations.

2.2 MONITORING PROTOCOL

A discrete monitoring protocol was developed by URS for use during the classroom RF studies and was followed at the following schools:

- Valley Academy of the Arts
- Cesar E. Chavez Learning Academy ARTES
- Cimarron Avenue School
- Harte Prep Middle School
- Diego Riviera Learning Complex
- Animo Westside Charter Middle School
- Paul Revere Middle School
- 54th Street School
- YES Academy
- Ambler Avenue School
- Rancho Dominguez Preparatory School

A detailed description of the monitoring protocol which standardized the preparation, operational settings of the SRM 3006, and classroom survey procedures was provided to LAUSD in document titled *Protocol: SRM Use LAUSD*.

This section presents a summary of the evaluations of near-field exposures during the operation of APs and use of selected end-devices (tablets).

Each evaluation presented in this section is composed of varied measurements that were collected with the SRM 3006 operating in spectrum analysis mode. Each measurement was collected at a specific location for a period of time representing an individual exposure scenario, such as "within an inch of a tablet while connected to the internet and running the application Brainpop."

The SRM 3006 can report various field strength outputs such as average (AVE), Maximum (MAX), and Minimum (MIN) for each frequency range. For this evaluation, the average data set was evaluated and compared to the LAUSD adopted criterion.

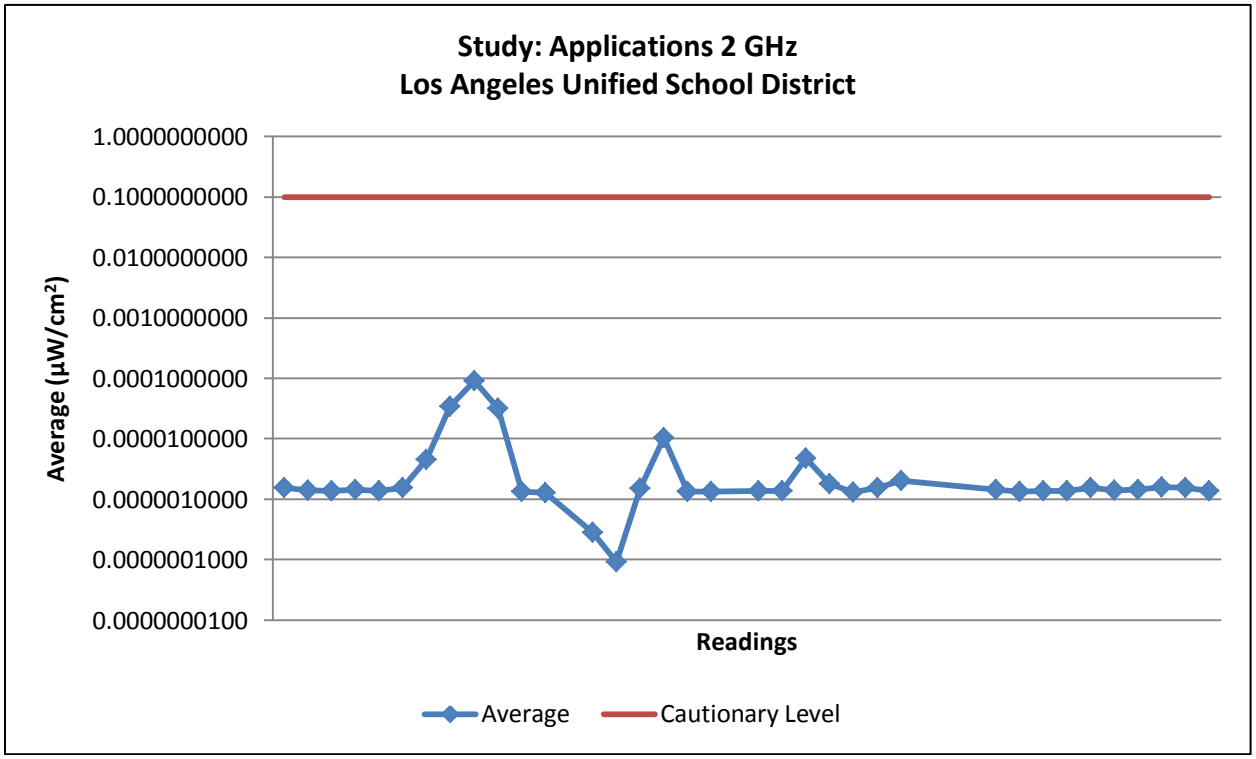
3.1 Application and Equipment Evaluations

3.1.1 2 GHz Wireless local area networks (WLANs) WLANs and Tablet Protocol Development Study, August 24 and 25th, 2013 (Application I)

The table below graphically displays average power density results for a series of measurements collected within 1 inch of an LAUSD configured tablet during the running of the following applications: Airwatch, Brainpop, Cargobot, Explain Everything, Fizzylunch, GraphcalcHD, iMovie, iPhoto, iTunes, Keynote, Kahn Academy, NASA Apps, Near Pod, Notability, Nova Elements, Pick-A-Path, Podcasts, PoppletLite, Rover Browser, Sid the Science Guy, Sketchbook Express, Sketch Pad Explorer, Skitch, WolfRamAlpha.

The highest average reading occurred during the running of a streaming iMovie at 0.00009 µW/cm^2 and is lower than the cautionary level adopted by the LAUSD of 0.1 µW/cm^2

Table 1: Summary of Average Power Density Readings Study: Application 2 GHz

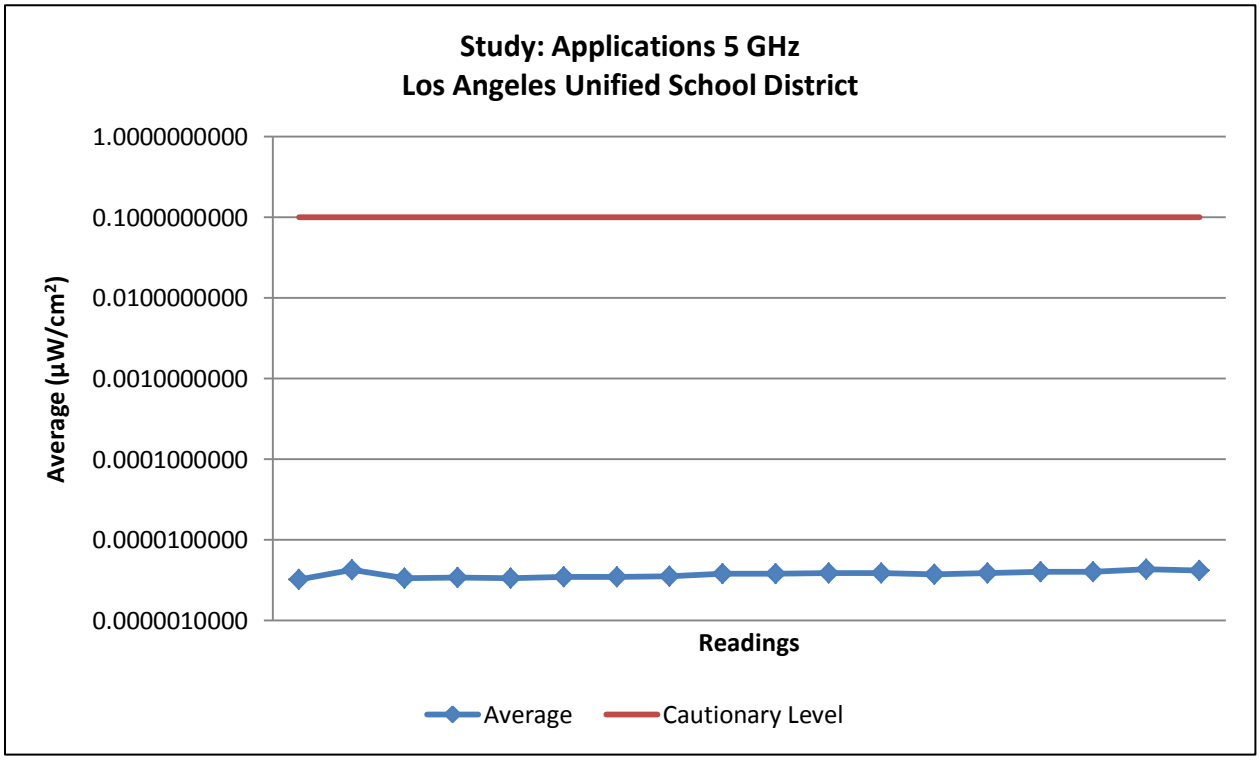


3.1.2 5 GHz WLAN and Tablet Application Protocol Development Study, October 11, 2013 (Application II)

The table below graphically displays the result of a series of average power density measurements collected within 1 inch of an LAUSD configured tablet during the running of the following applications: Airwatch, Brainpop, Cargobot, Freshpick, Garageband, iTunes, Kahn Academy, My Popplet, Notability, Nova Video, Pick-A-Path, Productivity, Rover Browser, Sid the Science Guy, Sketchbook Express, Skitch, WolfRamAlpha.

The highest average reading occurred during the running of the application Garageband at 0.000004 µW/cm^2 and is lower than the cautionary level adopted by the LAUSD of 0.1 µW/cm^2

Table 2: Summary of Average Power Density Readings Study: Application 5 GHz



3.1.3 In School Evaluations

3.1.4 Wireless Local Area Networks (WLANs) and Teacher Tablet Use During In-Service Training Protocol Development at Valley Academy of Arts and Sciences, August 5, 6, and 7, 2013

The following tables graphically display the result of a series of power density measurements collected during a teacher in-service at Valley Academy of Arts and Sciences. Measurements were collected to represent potential exposures during the downloading of Common Core and Mark Twain applications.

The highest average readings of 0.00002 µW/cm^2 and 0.000004 µW/cm^2 occurred during the downloading of Common Core and Mark Twain applications, respectively. The resulting average measurements are lower than the cautionary level adopted by the LAUSD of 0.1 µW/cm^2

Table 3: Summary of Average Power Density Readings Study: Teacher In-Service Downloading Applications - Common Core

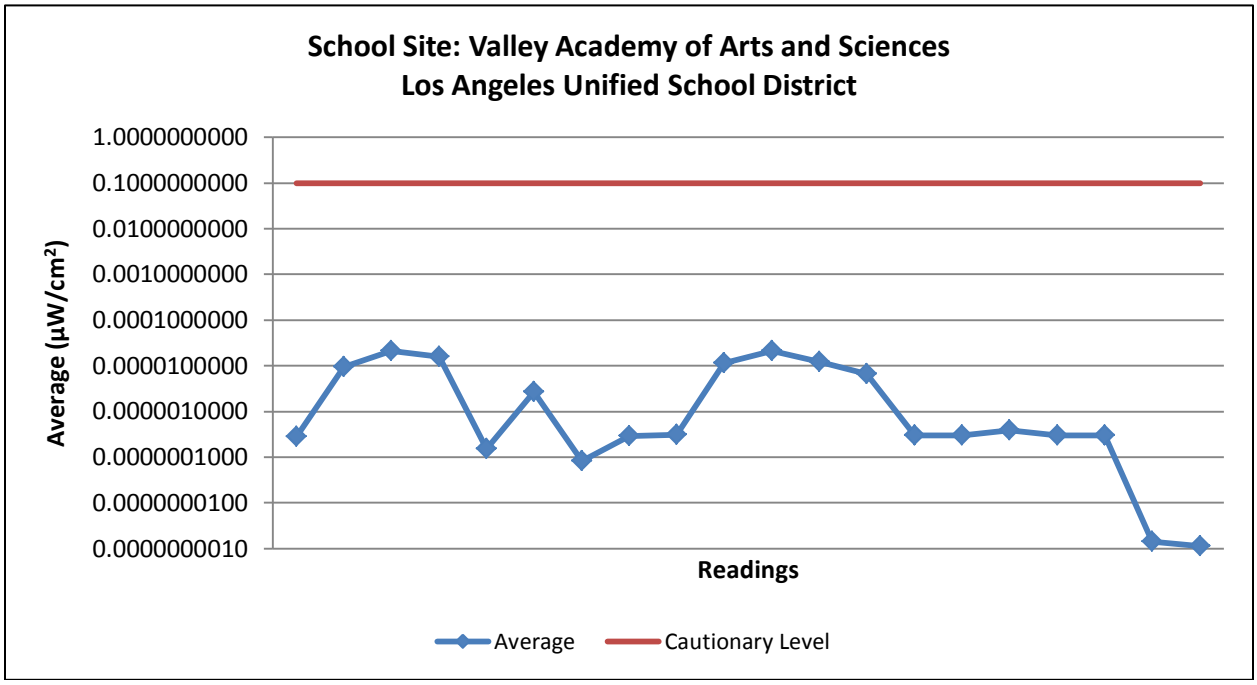
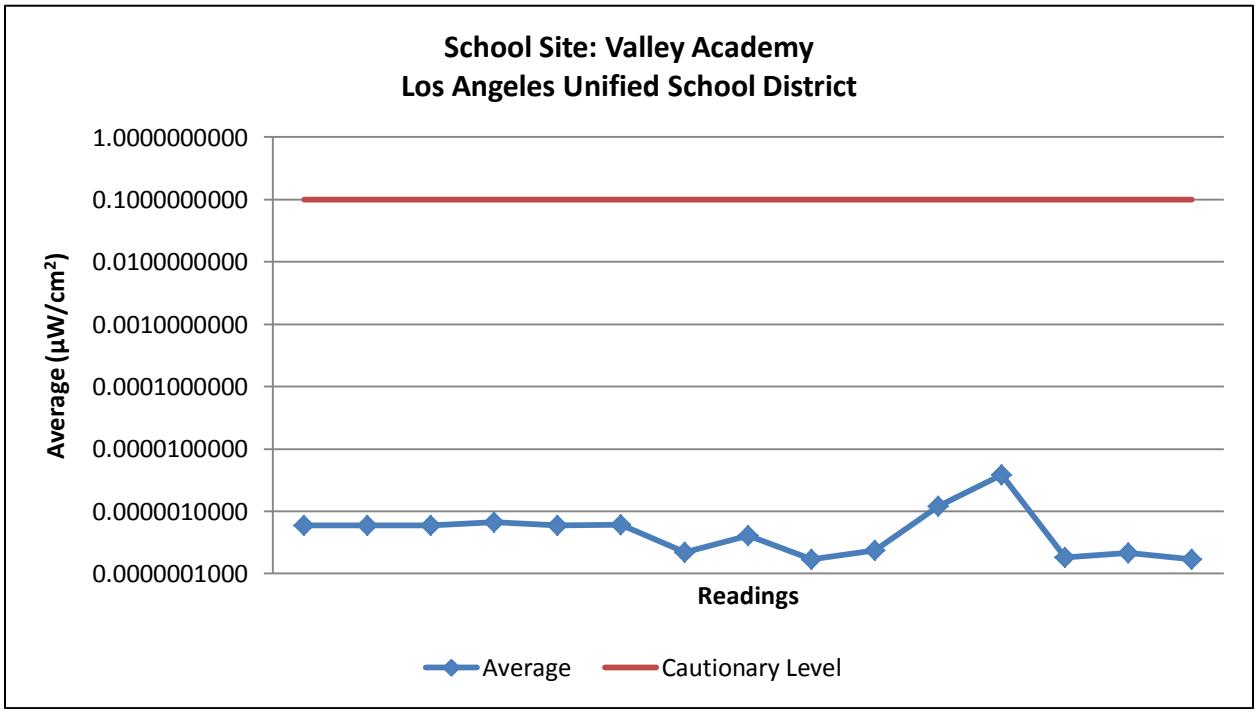


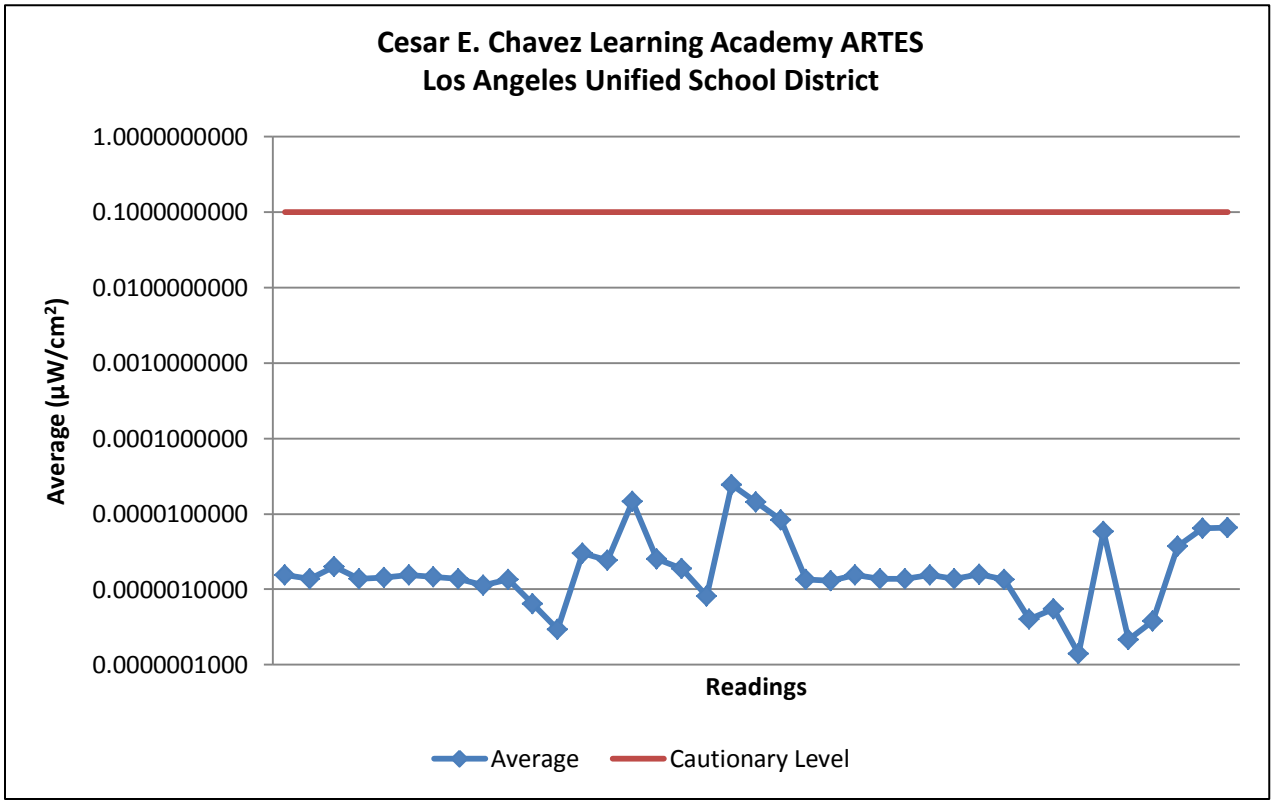
Table 4: Summary of Average Power Density Readings Study
Teacher In-Service Downloading Applications – Mark Twain



3.1.5 WLANs and Student Classroom Tablet Use at Cesar E. Chavez Learning Academy ARTES Protocol Development Study, August 26, 2013

The table below graphically displays the result of a series of average power density measurements collected during classroom activities when students were actively using their tablets. Some students were using applications with streaming content. The highest average reading of 0.00002 µW/cm^2 is lower than the cautionary level adopted by the LAUSD of 0.1 µW/cm^2

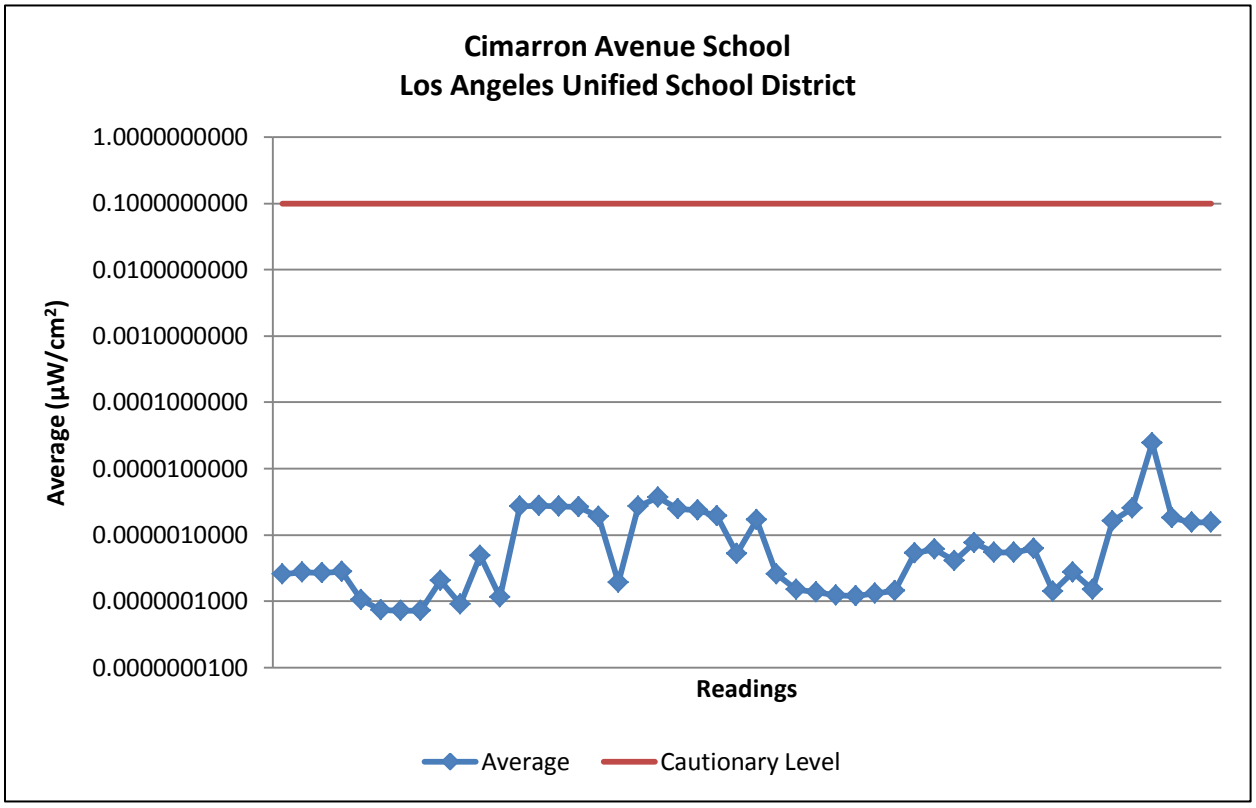
Table 5: Summary of Average Power Density Readings Study: Cesar E. Chavez Learning Academy ARTES – Protocol Development Study



3.1.6 WLANs and student classroom tablet use at Cimarron Avenue School, October 29, 2013

The table below graphically displays the result of a series of average power density measurements collected during classroom activities when students were actively using their tablets. Some students were using applications with streaming content. The highest average reading of 0.00002 µW/cm^2 is lower than the cautionary level adopted by the LAUSD of 0.1 µW/cm^2

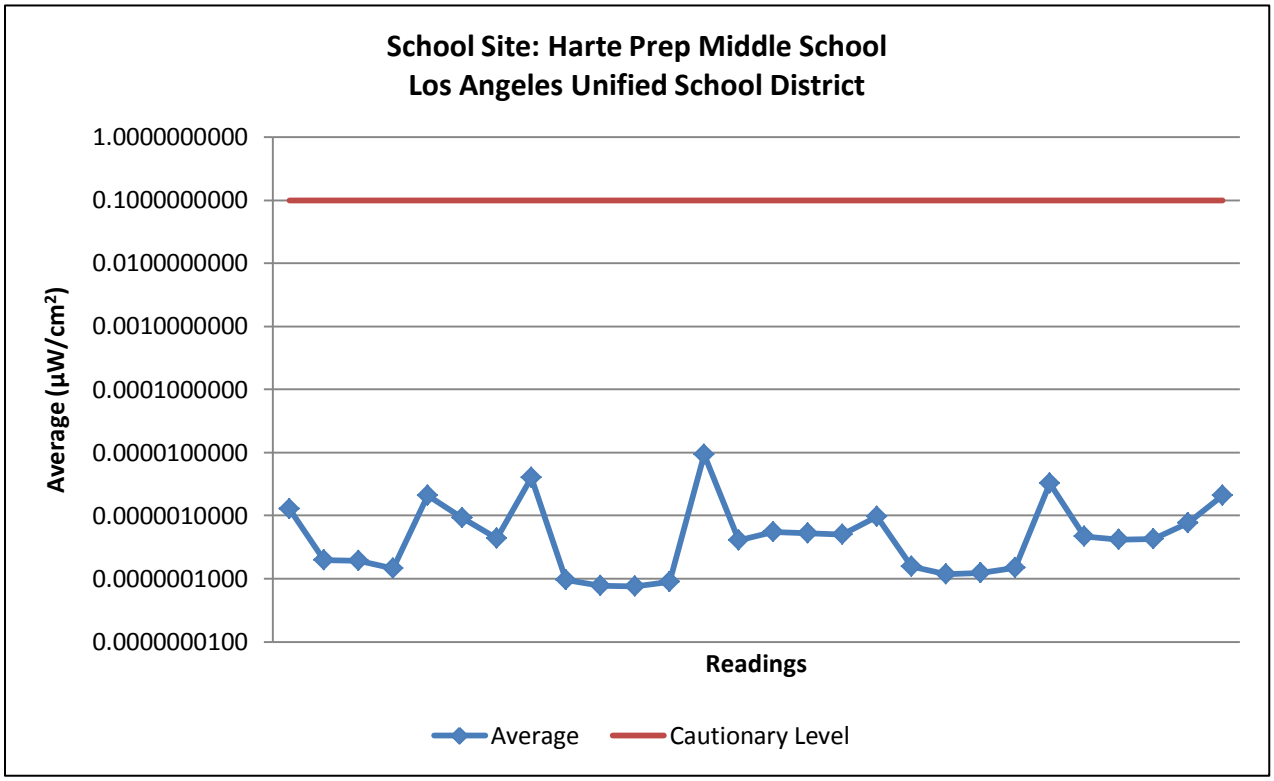
Table 6: Summary of Average Power Density Readings Study: Cimarron Avenue School



3.1.7 WLANs and student classroom tablet use at Harte Prep Middle School, October 29, 2013

The table below graphically displays the result of a series of average power density measurements collected during classroom activities when students were actively using their tablets. Some students were using applications with streaming content. The highest average reading of 0.000009 µW/cm^2 is lower than the cautionary level adopted by the LAUSD of 0.1 µW/cm^2

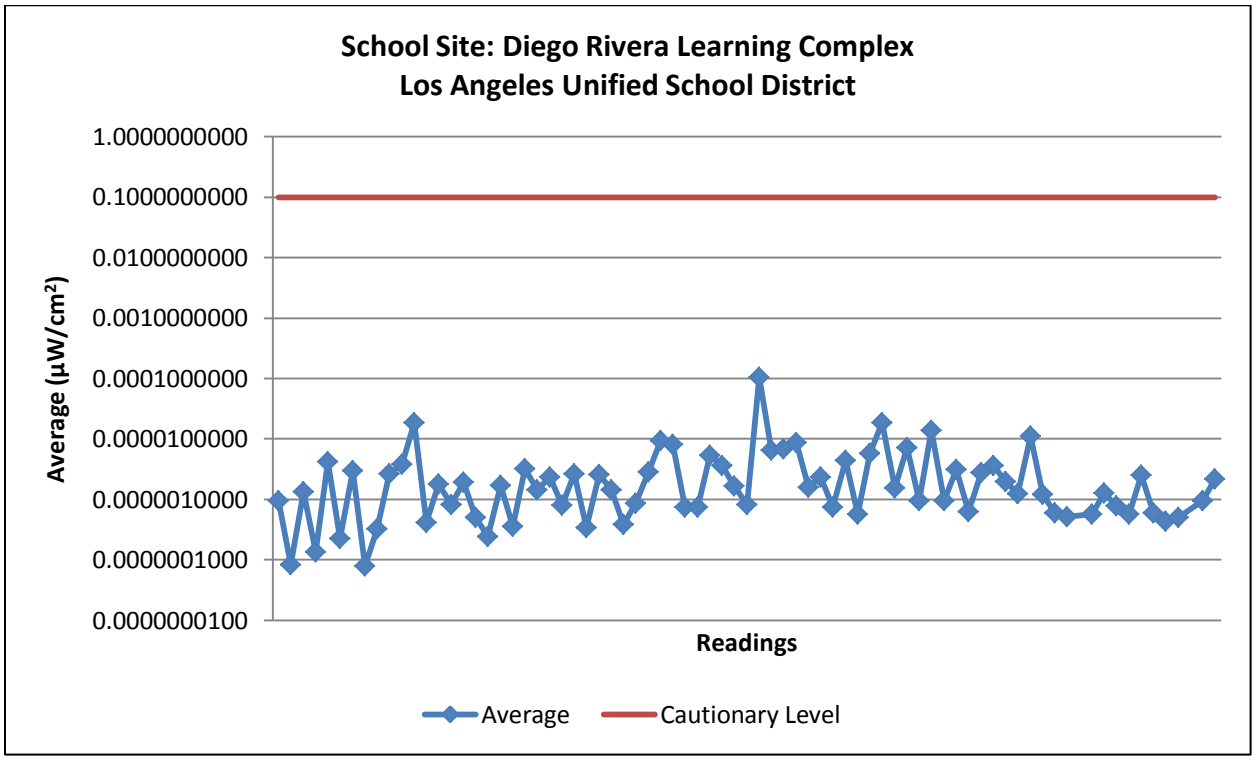
Table 7: Summary of Average Power Density Readings Study: Harte Prep Middle School



3.1.8 WLANs and student classroom tablet use at Diego Rivera Learning Complex, November 15, 2013

The table below graphically displays the result of a series of average power density measurements collected during classroom activities when students were actively using their tablets. Some students were using applications with streaming content. The highest average reading of 0.0001 µW/cm^2 is lower than the cautionary level adopted by the LAUSD of 0.1 µW/cm^2.

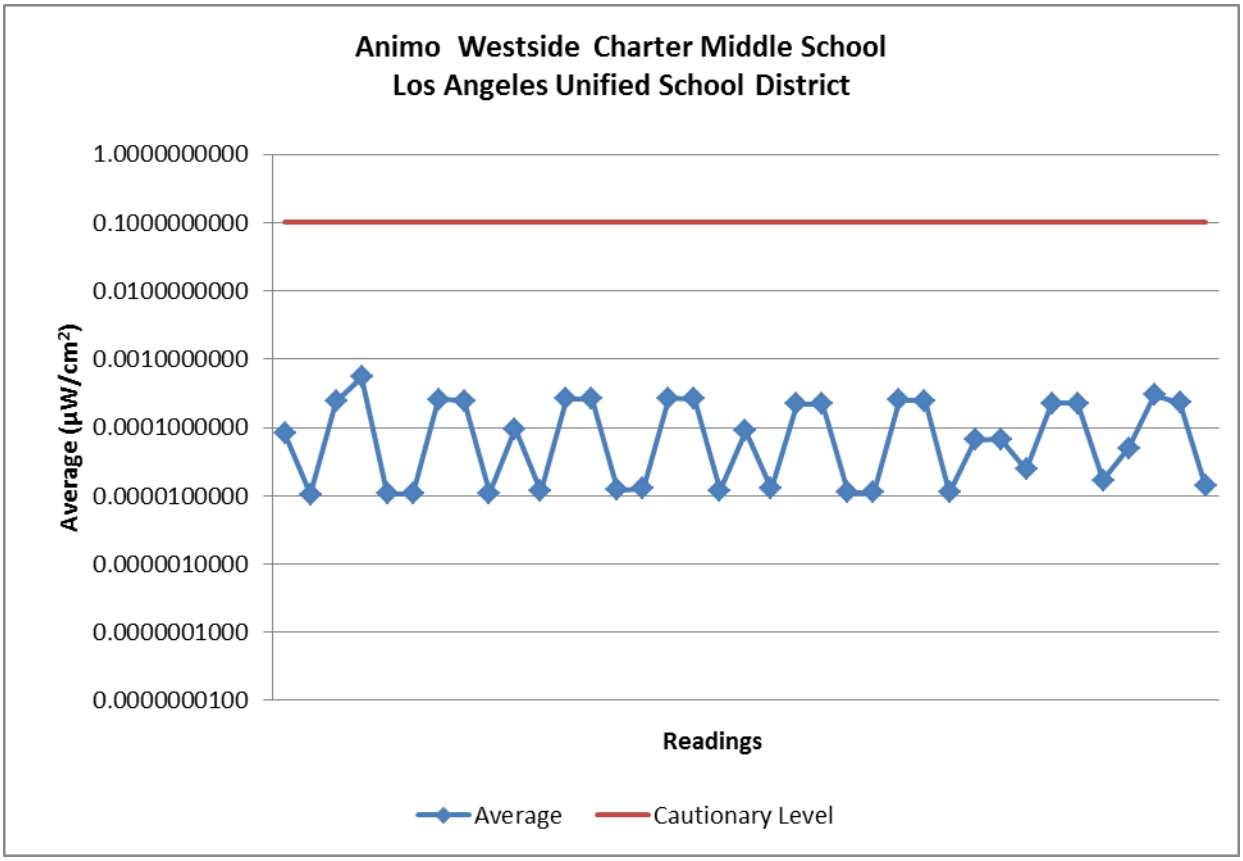
Table 8: Summary of Average Power Density Readings Study: Diego Riviera Learning Complex



3.1.9 WLANs and student classroom tablet use at Animo Westside Charter Middle School, February 13, 2014

The table below graphically displays the result of a series of average power density measurements collected during classroom activities when students were actively using their tablets. Some students were using applications with streaming content. The highest average reading of 0.00055 µW/cm^2 is lower than the cautionary level adopted by the LAUSD of 0.1 µW/cm^2.

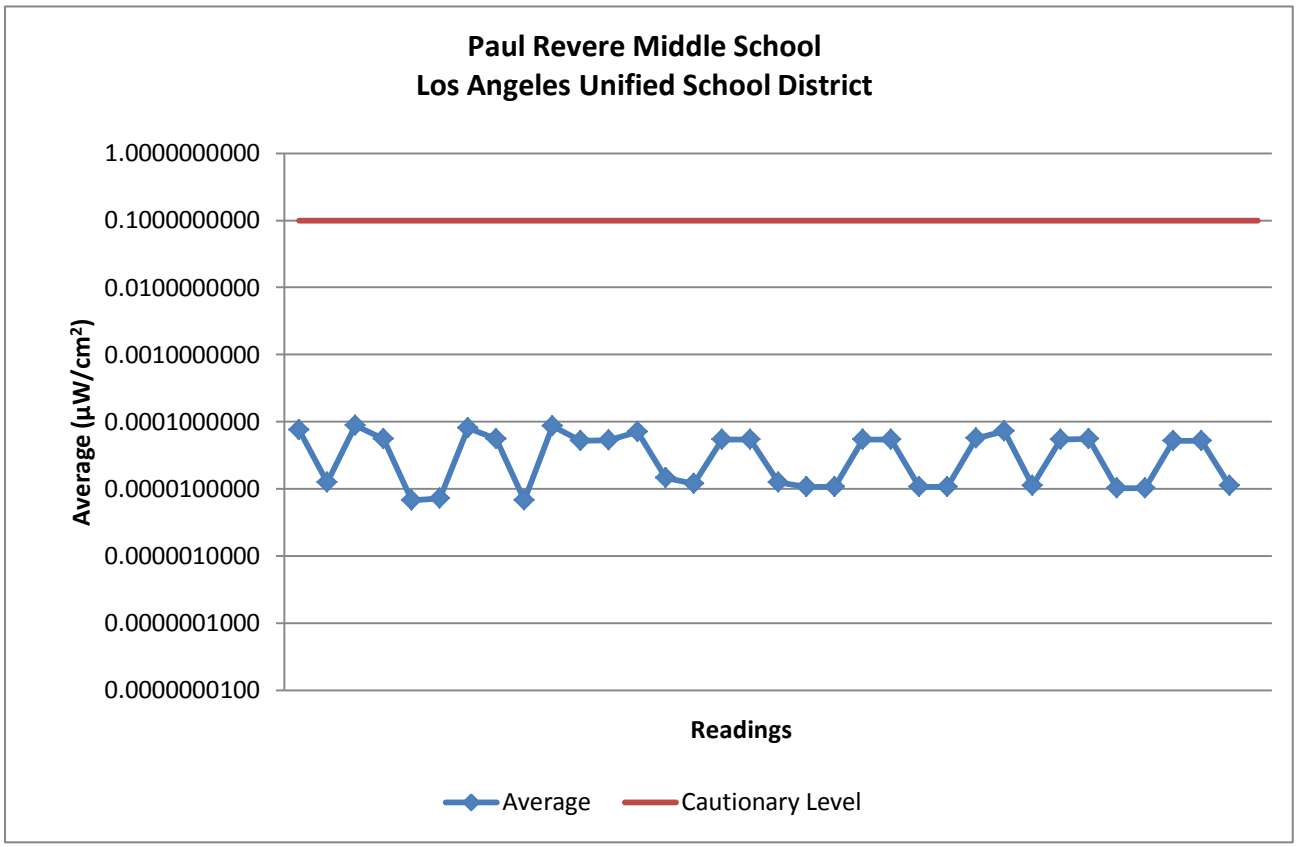
Table 9: Summary of Average Power Density Readings Study: Animo Westside Charter Middle School



3.1.10 WLANs and student classroom tablet use at Paul Revere Middle School, February 13, 2014

The table below graphically displays the result of a series of average power density measurements collected during classroom activities when students were actively using their tablets. Some students were using applications with streaming content. The highest average reading of 0.00009 µW/cm^2 is lower than the cautionary level adopted by the LAUSD of 0.1 µW/cm^2.

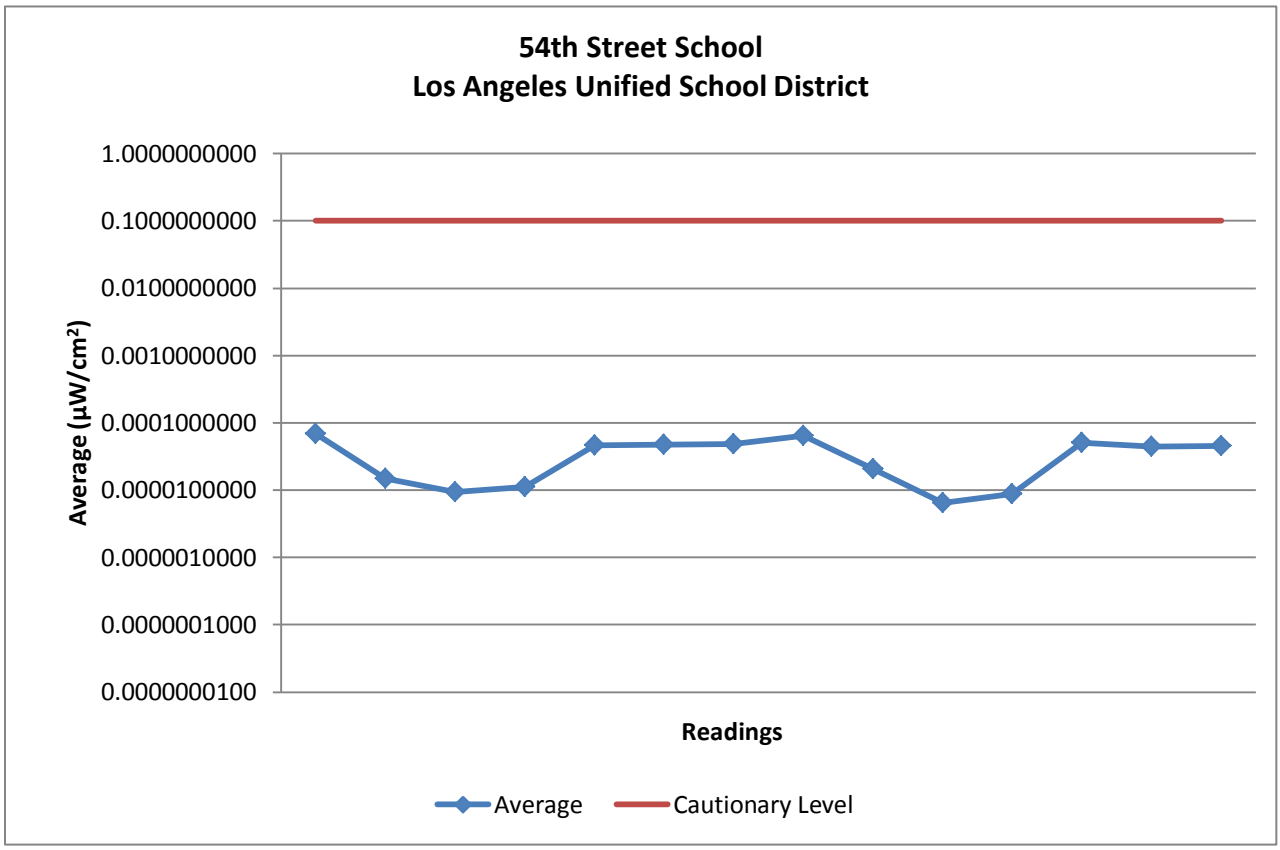
Table 10: Summary of Average Power Density Readings Study: Paul Revere Middle School



3.1.11 WLANs and student classroom tablet use at 54th Street School, February 27, 2014

The table below graphically displays the result of a series of average power density measruements collected during classroom activities when students were actively using their tablets. Some students were using applications with streaming content. The highest average reading of 0.00007 µW/cm^2 is lower than the cautionary level adopted by the LAUSD of 0.1 µW/cm^2.

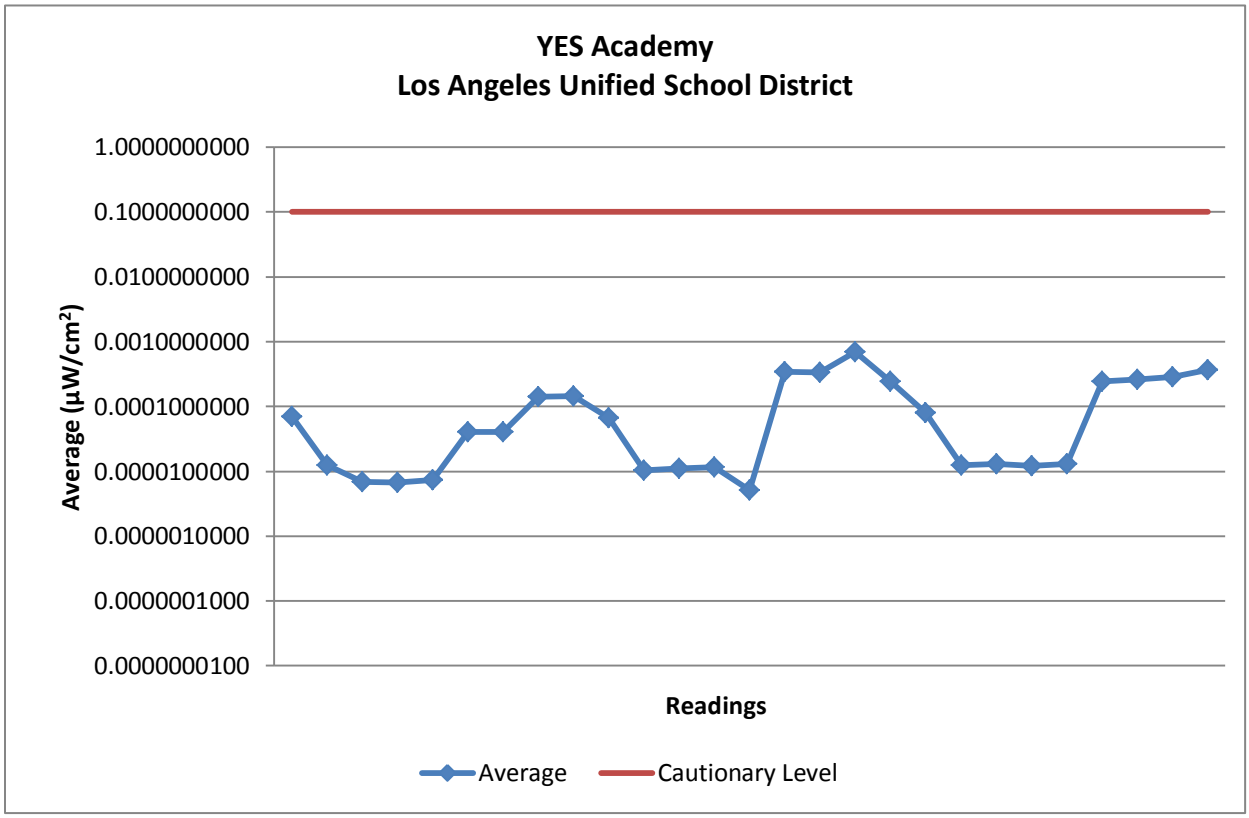
Table 11: Summary of Average Power Density Readings Study: 54th Street School



3.1.12 WLANs and student classroom tablet use at YES Academy, February 27, 2014

The table below graphically displays the result of a series of average power density measurements collected during classroom activities when students were actively using their tablets. Some students were using applications with streaming content. The highest average reading of 0.0007 µW/cm^2 is lower than the cautionary level adopted by the LAUSD of 0.1 µW/cm^2.

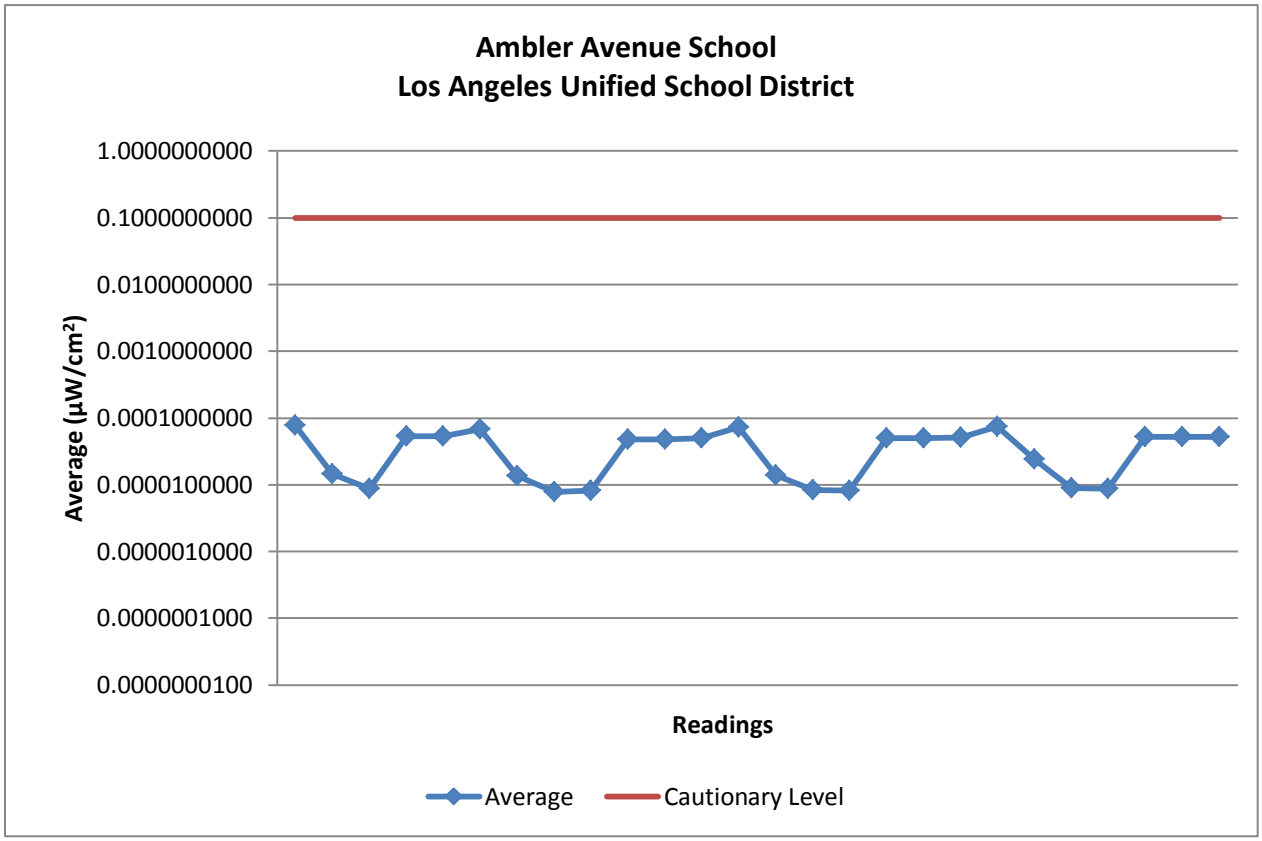
Table 12: Summary of Average Power Density Readings Study: YES Academy



3.1.13 WLANs and student classroom tablet use at Ambler Avenue School, March 20, 2014

The table below graphically displays the result of a series of average power density measurements collected during classroom activities when students were actively using their tablets. Some students were using applications with streaming content. The highest average reading of 0.00008 µW/cm^2 is lower than the cautionary level adopted by the LAUSD of 0.1 µW/cm^2.

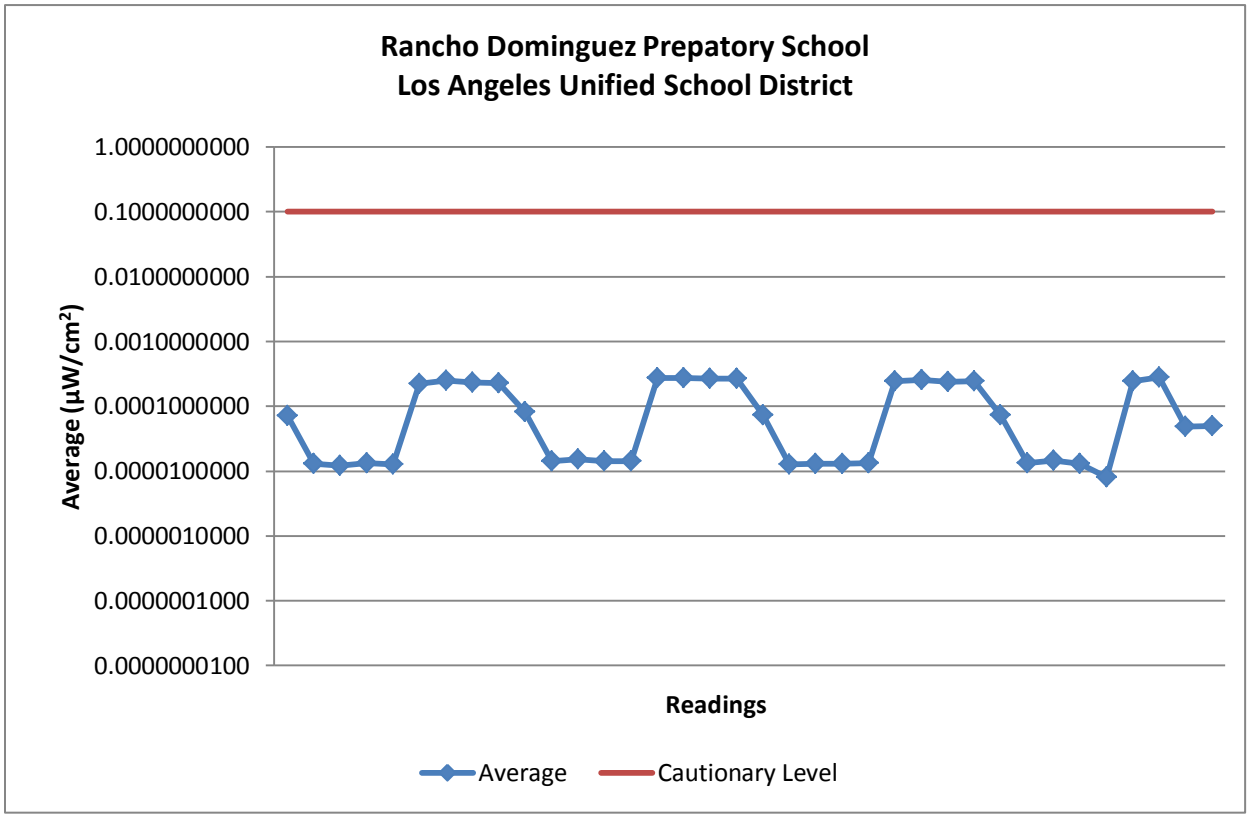
Table 13: Summary of Average Power Density Readings Study: Ambler Avenue School



3.1.14 WLANs and student classroom tablet use at Rancho Dominguez Preparatory School, March 20, 2014

The table below graphically displays the result of a series of average power density measruements collected during classroom activities when students were actively using their tablets. Some students were using applications with streaming content. The highest average reading of 0.0002 µW/cm^2 is lower than the cautionary level adopted by the LAUSD of 0.1 µW/cm^2.

Table 14: Summary of Average Power Density Readings Study: Rancho Dominguez Preparatory School



4.1 CONCLUSIONS

All of the average power density results were below the cautionary level adopted by the LAUSD. The LAUSD adopted the cautionary level field strength level of 0.1 µW/cm^2 for time-averaged, whole body exposure. The values measured in this assessment were collected while students were actively using their tablet devices. The results did not include lower exposures levels that would be found when the devices are not in use, therefore the actual average exposures would be lower than the measured results reported.

Given the wide variety of scenarios evaluated and that the results were all several orders of magnitude below the cautionary level, similar results below the cautionary level would be expected in classrooms containing the same equipment evaluated.

The opinions and judgments expressed in this RF Summary Report are based on URS's research and interpretations of this report. The report is limited by the amount and type of information provided to URS by the LAUSD. These conclusions and recommendations may be subject to change if other factors impact the organization.

AAMI. Active Implantable Medical Devices – Electromagnetic Compatibility – EMC Test Protocols for Implantable Cardiac Pacemakers and Implantable Cardiac Defibrillators. ANSI/AAMI PC69:**2007**, July 25, 2008.

ACGIH. **2008** TLVs and BEIs. Publication #0108. Available at http://www.acgih.org/store/ProductDetail.cfm?id=1975.

Alaska court rules for telecom installer in radiation exposure case. *Safety & Health*, Oct, **2007**, 176(4), p29.

Baliatsas, C.; van Kamp, I.; Kelfkens, G.; Schipper, M.; Bolte, J.; Yzermans, J.; Lebret, E. Non-specific physical symptoms in relation to actual and perceived proximity to mobile phone base stations and powerlines. BMC Public Health, 11, **2011**, 421-432.

Beltran San Segundo, H.; Fuster Roig, V. Reduction of low voltage power cables electromagnetic field emission in MV/LV substations. *Electric Power Systems Research*, June, **2008**, 78(6), p1080 – 1088.

Bolte, J; Eikelboom, T. Personal radiofrequency electromagnetic field measurements in the Netherlands: Exposure level and variability for everyday activities, times of day and types of area. *Environ. Int.*, 48, Nov 1, **2012**, p. 133-142.

Bortkiewicz, A.; Gadzicka, E.; ZmyŞlony, M.; Szymczak, W. Neurovegetative Disturbances in Workers Exposed to 50 Hz Electromagnetic Fields. *International Journal of Occupational Medicine & Environmental Health*, Jan, **2006**, 19(1), p53 – 60.

Bracken, T. D.; Rankin, R. F.; Senior, R. S.; Kavet, R.; Geissinger, L. G. Magnetic-Field Exposures of Cable Splicers in Electrical Network Distribution Vaults. *Applied Occupational and Environmental Hygiene*, **2001**, 16(3), p 369-379.

Breckenkamp, J.; Blettner, M.; Schüz, J.; Bornkessel, C.; Schmeidel, S.; Schlehofer, B.; Berg-Becckhoff, G. Residential Characteristics and Radiofrequency Electromagnetic Field Exposures from Bedroom Measurements in Germany. *Radiat Environ Biophys*, 51, **2012**, p. 85–92.

Bouchouicha, D.; Dupont, F.; Latrach, M.; Ventura, L. Ambient RF Energy Harvesting. International Conference on Renewable Energies and Power Quality, European Association for the Development of Renewable Energies, Environment and Power Quality, Granada, Spain, March 23 to 25, **2010**.

Budi, A.; Legge, F. S.; Treutlein, H.; Yarovsky, I. Effect of Frequency on Insulin Response to Electric Field Stress. *Journal of Physical Chemistry B*, May, **2007**, 111(20), p5748 – 5756.

Cardis, E.; Deltour, I.; Mann, S.; Moissinnier, M.; Taki, M.; Varsier, N.; Wake, K.; Wiart, J. Distribution of RF Energy Emitted by Mobile Phones in Anatomical Structures of the Brain. *Physics in Medicine and Biology*, 53, **2008**, p. 2771-2783.

Carpenter, D.O. Human Health Effects of EMFs: The Cost of Doing Nothing. Electromagnetic Phenomena and Health-a Continuing Controversy? IOP Conference Series: Earth and Environmental Science, 10, **2010**, available at http://iopscience.iop.org/1755-1315/10/1/012004/pdf/EES10_10_012004.pdf.

Carpenter, D.O. Amended Declaration of Dr. David O. Carpenter, M.D. US Distric Court, District of Oregon, Civil Action # 3:11-cv-00739-MO. December 20, **2011**. Available at http://www.wirelesswatchblog.org/wp-content/uploads/2001/11/Amended-Declaration-of-Dr-David-Carpenter.pdf.

Carpenter, D. O. Smart Meters: Correcting the Gross Misinformation. Maison, June 11**, 2012**. Available at http://maisonsaine.ca/smart-meters-correcting-the-gross-misinformation/www.maisonsaine.ca.

Carpenter, D.; Sage, S. Bioinitiative Report: A Rational for Biologically-based Public Exposure Standard for Electromagnetic Fields (ELF and RF). August 31, **2007**. Available at http://www.bioinitiative.org/.

Carpenter, D.; Sage, S. BioInitiative Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Radiation. December 31, **2012**. Available at http://www.bioinitiative.org.

Costa, C. P.; Fontgelland, G.; Barbin, S. E. Analysis of Passive Electromagnetic Exposure to Multisource Distributed in Outdoor Places. 2012 IEEE Topical Conference on Biomedical Wireless Technolgies, Networks, and Sensing Systems (BiowireleSS), **2012**, p. 81-84.

Council Recommendation (1999/519/EC). On the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz). *Official Journal of the European Communities*, July 12, **1999**.

Cricenti, A.; Generosi, R.; Luce, M.; Perfetti, P.; Sanghera, J. S.; Aggarwal, I. D.; Tolk, N. H.; Vobornik, D.; Margaritondo, G.; Piston, D. W.; Manni, V.; Grimaldi, S.; Lisi, A.; Rieti, S. Low-frequency electromagnetic field effects on functional groups in human skin keratinocytes cells revealed by IR-SNOM. *Journal of Microscopy*, Mar, **2008** Supplement, 229(3), p551-554.

Electric Power Research Institute (EIRP). EPRI Comment: Sage Report on Radio-Frequency (RF) Exposures from Smart Meters. February, **2011**. Available at http://www.marbleheadelectric.com/EPRI_SageReport.pdf.

European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN). Risk Analysis of Human Exposure to Electromagnetic Fields. July **2010**. Available at http://efhran.polimi.it/docs/EFHRAN_D2_final.pdf.

EMF-Link. Information Ventures, Inc. http://infoventures.com/private/federal/q&a/qa-envn2.html. January 12, **2000**.

European directive on electromagnetic fields. *European Radiology*. Dec., **2006**, 16(12), p2886 – 2889.

FCC. Wireless Devices and Health Concerns. Available at http://www.fcc.gov/guides/wireless-devices-and-health-concerns, accessed 11/14/**2012**.

FCC. Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields. Office of Engineering & Technology, OET Bulletin 56, 4th Edition, August, **1999**.

FCC. Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields. Office of Engineering & Technology, OET Bulletin 65, Edition 97-01, August, **1997**.

Findlay, R.P.; Dimbylow, P.J. SAR in children from exposure to wireless local area networks (WLAN). 2012 Asia-Pacific Symposium on Electromagnetic Compatibility (APEMC), May 21-24, **2012**, p. 733 – 736.

Foster, K. R. Radiofrequency Exposure From Wireless LANS Utilizing Wi-Fi Technology. *Health Physics*, March **2007**, 92(3), p. 280-289.

Foster, K. R. Response to Lora Lee Martin Regarding Smart Meters and EMFs, September 23, **2010**, available at http://www.ccst.us/projects/smart/documents/foster_response.pdf.

Foster, K. R. Exposure Limits for Radiofrequency Energy: Three Models. World Health Organization, Conference on Criteria for EMF Standards Harmonization. Available at http://www.who.int/peh-emf/meetings/day2Varna_Foster.pdf.

Frei, P. Personal Exposure to Radiofrequency Electromagnetic Fields and Implications for Health. PhD Thesis, University of Basel, Germany, **2010**. Available at http://edoc.unibas.ch/1255/.

Frei, P.; Mohler, E.; Braun-Fahrländer, C.; Fröhlich, J.; Neubauer, G.; Röösli, M. Cohort study on the effects of everyday life radio frequency electromagnetic field exposure on non-specific symptoms and tinnitus, *Environment International*, 38, **2012**, p. 29–36.

Genuis, Stephen J. Fielding a current idea: exploring the public health impact of electromagnetic radiation. *Public Health*, Feb, **2008**, 122(2), p113 – 124.

Grigoriev, Y. Electromagnetic Fields and the Public: EMF Standards and Estimation of Risk. IOP Conference Series: Earth and Environmental Sciences, 10(1), **2010**. Available at http://iopscience.iop.org/1755-1315/10/1/012003.

Hagerty, J.; Helmbrecht, F.; McCalpin, W.; Zane, R.; Popovic, Z. Recycling Ambient Microwave Energy With Broad-Band Rectenna Arrays. IEEE Transactions on Microwave Theory and Techniques, 52(3), March **2004**, p 1014-1024.

Hamza, A.H.; Mahmoud, Shaher A.; Abdel-Gawad, N.M.; Ghania, Samy M. Evaluation of magnetic induction inside humans at high voltage substations. *Electric Power Systems Research*, May, **2005**, 74(2), p231 – 237.

Hand, J.W. Modeling the Interaction of Electromagnetic Fields (10 MHz-10 GHz) with in the Human Body: Methods and Applications. *Physics in Medicine and Biology*, 53, **2008**, R243–R286.

Herberman, R. B. Tumors and Cell Phone Use: What the Science Says. Domestic Policy Subcommittee, Oversight and Government Reform Committee, Thursday, September 25, **2008**. Available at http://cellphones.procon.org/sourcefiles/Herberman_Testimony.pdf.

Institute of Electrical and Electronics Engineers (IEEE) Standard C95.1-2005, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz" (IEEE Std C95.1-**2005**).

International Agency for Research on Cancer (IARC). IARC Classifies Radiofrequency Electromagnetic Fields as Possibly Carcinogenic to Humans. World Health Organization, Lyon, France, May 31, **2011**. Available at http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf.

IARC. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. World Health Organization, Lyon, France, **2006**. Available at http://monographs.iarc.fr/ENG/Preamble/CurrentPreamble.pdf.

IARC. Interphone Study Reports on Mobile Phone Use and Brain Cancer Risk, May 17, **2010**. Available at http://www.iarc.fr/en/media-centre/pr/2010/pdfs/pr200_E.pdf.

International Commission on Non-Ionizing Radiation Protection (ICNIRP), Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields, ICNIRP Guidelines, Health Physics Society, April, **1998**, 74(4), p494-522.

ICRP, **1993**. Protection from Potential Exposure - A Conceptual Framework. ICRP Publication 64. Ann. ICRP 23 (1).

ICNIRP. Guidelines on Limits of Exposure to Static Magnetic Fields, *Health Physics*, **2009**, 96(4), p 504-514.

ICNIRP, Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz to 100 kHz), *Health Physics*, **2010**. 99(6), p. 818-836.

ICNIRP. Fact Sheet on Guidelines for Limiting Exposure to Time-Varying Electric & Magnetic Fields (1 Hz to 100 kHz), *Health Physics Society*, **2010**, 99(6), p 818-836.

Ippolito, L.; Siano, P. Using multi-objective optimal power flow for reducing magnetic fields from power lines. *Electric Power Systems Research*, Feb, **2004**, 68(2), p93.

IEEE. IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. IEEE Std C95.1-2005, April 19, **2006**.

ISO. Active Implantable Medical Devices – Electromagnetic Compatibility – EMC Test Protocols for Implantable Cardiac Pacemakers, Implantable Cardiac Defibrillators, and Cardiac Resynchronization Devices. ISO/Draft International Standard 14117, **2010**.

Johansen, C.; Raaschou-Nielsen, O.; Skotte, J.; Thomsen, B. L.; Olsen, J. H. Validation of a Job-Exposure Matrix for Assessment of Utility Worker Exposure to Magnetic Fields. *Applied Occupational & Environmental Hygiene*, Apr, **2002**, 17(4), p304 – 310.

Karipidis, K. K. Is the Risk Comparison Made by the Public Between EMF and Smoking or Asbestos a Valid One? *Journal of Risk Research*, 10(3), April **2007**, p. 307–322.

Khalid, M.; Mee, T.; Peyman, A.; Addison, D.; Calderon, C.; Maslanyj, M.; Mann, S. Exposure to radio frequency electromagnetic fields from wireless computer networks: Duty factors of Wi-Fi devices operating in schools. *Prog. Biophys. Mol. Biol.* 107 (3), **2011**, p. 412-20.

Kheifets, L.; Afifi, A. A.; Shimkhada, R. Public Health Impact of Extremely Low-Frequency Electromagnetic Fields. *Environmental Health Perspectives*, Oct, **2006**, 114(10), p1532 – 1537.

Kheifets, L.; Swanson, J.; Kandel, S.; Malloy, T. Risk Governance for Mobile Phones, Power Lines, and Other EMF Technologies. *Risk Analysis*, 30(10), **2010**, p. 1481-1494.

LAUSD. T-Mobile Cell Tower Notification and Condemnation (Waiver of Board Rule 72), Motions/Resolutions Presented to The Los Angeles City Board of Education for Consideration, December 8, **2009**.

LAUSD. Effects of Non-Ionizing Radiation (Waiver of Board Rule 72), Motions/Resolutions Presented to The Los Angeles City Board of Education for Consideration, June 13, **2000**.

Leck, R. World Meteorological Organization, Results of Ambient RF Environment and Noise Floor Measurements Taken in the U.S. in 2004 and 2005, Commission for Basic Ssytems Steering Group on Radiofrequency Coordination, Geneva, March 16-18, **2006**.

LeDevoir, Smart Meters, Cell Phones, and WiFi. May 24, **2012**: Available at http://www.ledevoir.com/environnement/actualites-sur-l-environnement/350726/pour-un-debat-guidepar-la-science.

PG&E. RadioFrequency FAQ. Available at http://www.pge.com/mybusiness/edusafety/systemworks/rf/faq/, accessed November 30, **2012**.

Possible effects of Electromagnetic Fields (EMF) on Human Health - Opinion of the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). *Toxicology*, Apr, **2008**, 246(2/3), p248-250.

Purcell, E. M. Electricity and Magnetism. Berkeley Physics Course Volume 2. 2nd Edition. McGraw-Hill, Inc., New York, **1985**.

Raz, Amir. ask the Brains. *Scientific American Mind*, **2006**, 17(4), p82.

Regel, S. J.; Tinguely, G.; Schuderer, J.; Adam, M.; Kuster, N.; Landolt, H.; Achermann, P. Pulsed radio-frequency electromagnetic fields: dose-dependent effects on sleep, the sleep EEG and cognitive performance. *Journal of Sleep Research*, Sept, **2007**, 16(3), p253 – 258.

Sage, C.; Carpenter, D.O. (in press) Public health implications of wireless technologies, *Pathophysiology* **2009**, available at http://www.ntia.doc.gov/legacy/broadbandgrants/comments/6E05.pdf.

Sage, C.; Johansson, O.; Sage, S. Personal Digital Assistant (PDA) Cell Phone Units Produce Elevated Extremely-Low Frequency Electromagnetic field Emissions. Bioelectromagnetics, **2007**. Available at http://www.buergerwelle.de/assets/files/sage_pda_bems_on_line.pdf.

Sage, C. Assessment of Radiofrequency Microwave Radiation Emissions from Smart Meters. Sage Associate, Santa Barbara, CA, January 1, **2011**, available at http://sagereports.com/smart-meter-rf/.

Salzburg Resolution on Mobile Telecommunication Base Stations. International Conference on Cell Tower Siting, Linking Science & Public Health, Salzburg, June 7-8, **2000**. Available at http://www.salzburg.gv.at/themen/gs/gesundheit/landessanitaetsdirektion-2/gesundheitsschwerpunkte/umweltmedizin/elektrosmog/celltower_e.htm#ank-salzburg.

Scientific Committee on Toxicity, Ecotoxicity and the Environment (CSTEE). Opinion on Possible effects of Electromagnetic Fields (EMF), Radio Frequency Fields (RF) and Microwave Radiation on human health, Expressed at the 27th CSTEE plenary meeting, Brussels, October 30, **2001**.

Selvam, R.; Ganesan, K.; Narayana R.; Gangadharan, A. C.; Manohar, B. M.; Puvanakrishnan, R. Low frequency and low intensity pulsed electromagnetic field exerts its antiinflammatory effect through restoration of plasma membrane calcium ATPase activity. *Life Sciences*, Jun, **2007**, 80(26), p2403 – 2410.

Stam. R. Comparison of International Policies on Electromagnetic Fields (Power Frequency and Radiofrequency Fields). National Institute for Public Health, the Netherlands, May, **2011**. Available at http://ec.europa.eu/health/electromagnetic_fields/docs/emf_comparision_policies_en.pdf.

US Government Accountability Office, Telecommunications: Exposure and Testing Requirements for Mobile Phones Should be Reassessed, Report to Congressional Requesters, July, **2012,** GAO-12-771.

Verschaeve, L. Evaluations of International Expert Group Reports on the Biological Effects of Radiofrequency Fields. Chapter 20, INTECH 978-953-51-0189-5, March 14, 2012, available at http://www.intechopen.com/books/wireless-communications-and-networks-recent-advances/evaluations-of-international-expert-group-reports-on-the-biological-effects-of-radiofrequency-fields.

Vullers, R.; van Schaijk, R.; Doms, I.; Van Hoof, C.; Mertens, R. Micropower Energy Harvesting. *Solid-State Electronics*, 53, **2009**, p. 684–693.

Wake, K.; Arima, T.; Watanabe, S.; Taki, M. SAR distributions in a child head phantom in the vicinity of recent mobile phones. General Assembly and Scientific Symposium, August 13-20, **2011**.

WHO. What are Electromagnetic Fields? Accessed November 15, **2012**. Available at http://www.who.int/peh-emf/about/WhatisEMF/en/index4.html.

Yang, K.; Ju, M.; Myung, S.; Shin, K.; Hwang, G.; Park, J. Development of a New Personal Magnetic Field Exposure Estimateion Method for Une in epidemiological EMF Surveys Among Children Uner 17 Years of Age. *Journal of Electrical Engineering & Technology*, 7(3), **2012**, p. 376-383.

Zorzi, C.; Dall'Oca, C.; Cadossi, R.; Setti, S. Effects of pulsed electromagnetic fields on patients' recovery after arthroscopic surgery: prospective, randomized and double-blind study. *Knee Surgery, Sports Traumatology, Arthroscopy*, Jul, **2007**, 15(7), p830 – 834.