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**INDUSTRIAL HYGIENE SURVEY REPORT – EMF STUDY
ACACIA ELEMENTARY SCHOOL
1200 NORTH ACACIA AVENUE
FULLERTON, CALIFORNIA 92831**

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Chief Executive Officer



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EE Project # 13-A0043-0054
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EE Project #: 13-A0043-0054

ASCIP Project #: 13-6312

Client: Fullerton School District
1401 West Valencia Drive
Fullerton, California 92833

Survey Dates: March 11 and 29, and June 13, 2013

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George Valverde, CSST (March 29, 2013)
Industrial Hygienist and

Chris Peterson (March 29, 2013)
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Report By: Susan Browne Rosenberg, CIH, CHMM, CIEC
Senior Industrial Hygienist

Reviewed By: Daniel H. Ginsborg, MSIH, CIH, CSP
Chief Executive Officer

Report

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Alliance of Schools for Cooperative Insurance Programs (ASCIP)

I. PURPOSE

The purpose of this study was to provide a limited indoor environmental quality (IEQ) screening study of electromagnetic fields (EMFs) including radio frequency (RF). This study focused on potential EMF related to wireless access point (AP) technology (commonly referred to as "WiFi"^A) installed near Room 7 at Acacia Elementary School of the Fullerton School District (hereinafter, the District). The WiFi reportedly has been installed and operated in conformance with the Institute of

^A Not to be confused with Wi-Fi™ a trademark of Wi-Fi Alliance and a brand name certifying that a device or other product is compatible with a set of broadband wireless networking standards.

Electrical and Electronics Engineers (IEEE) Standard 802.11. All APs and devices were reportedly tested/certified to comply with the Federal Communication Commission (FCC) Standard for home and office use. Reportedly, these tests/certifications are done by the manufacturer at time of manufacture. Measurements were collected on the existing WiFi in the RF range of 2.35 to 2.55 gigahertz (GHz); reportedly the WiFi is centered at 2.45 GHz and functions in the range of 2.4 to 2.5 GHz. This survey was provided as a benefit of membership in the Alliance of Schools for Cooperative Insurance Programs (ASCIP).

II. SUMMARY OF FINDINGS

The purpose of this study was to measure EMF exposures around iPads and WiFi APs in Room 7. The results of the study indicate the following as detailed in Table I:

- Peak (instantaneous) power density measurements in Room 7 were below 0.01 microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$) and, except for one reading, all average levels for readings spanning six seconds to six minutes were below $0.000004 \mu\text{W}/\text{cm}^2$. One six-second average reading at Table D (prior to video streaming; devices were in sleep mode) measured $0.000017 \mu\text{W}/\text{cm}^2$.
- In general, average measurements of EMF ranged from 1 to 3.5 picowatts per square centimeter (pW/cm^2). This is equivalent to a range of 0.000001 to $0.0000035 \mu\text{W}/\text{cm}^2$. Measurements were averaged over varying times from six seconds to six minutes.
- Maximum peak readings during staged video streaming on all 34 devices ranged from 1 to 6.4 nanowatts per square centimeter, which is equivalent to 0.001 to $0.0064 \mu\text{W}/\text{cm}^2$.
- Maximum peak readings during typical teaching tasks (apps used by District teachers) on eight devices in a typical pod of student desks ranged from 1 to 3 nanowatts per square centimeter, which is equivalent to 0.001 to $0.003 \mu\text{W}/\text{cm}^2$. Average readings over two-minute periods during teaching tasks ranged from 1 to 2 pW/cm^2 , equivalent to a range of 0.000001 to $0.000002 \mu\text{W}/\text{cm}^2$.
- The average two-minute power density reading with eight devices^B on one table running typical teaching task apps was lower ($0.000000971 \mu\text{W}/\text{cm}^2$) than readings from just one device. This is most likely because of limited bandwidth, which prevents all devices from accessing the WiFi AP at the same time.
- All spot EMF (RF) measurements were **significantly below** the Federal Communication Commission Maximum Permissible Exposure Limits for general population/uncontrolled exposure^C for 1.5 to 100 GHz of $1.0 \text{ mW}/\text{cm}^2$ or $1,000 \mu\text{W}/\text{cm}^2$.
- All spot EMF (RF) measurements were also **below** the Los Angeles Unified School District Precautionary Threshold Level^D of $0.1 \mu\text{W}/\text{cm}^2$.

III. BACKGROUND AND GENERAL OBSERVATIONS

This investigation was conducted at your request to address a parent's concerns regarding electromagnetic fields emanating from WiFi access points and iPad usage in Room 7. On March

^B Full size and Mini iPads

^C General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

^D http://www.lausd-oehs.org/docs/Misc/Radiofrequency_Safety_Fact_Sheet_021113a.pdf

11, 2013, Mr. Daniel H. Ginsborg, MSIH, CIH, CSP, Chief Executive Officer, with Executive Environmental (EE), visited the school and met with Ms. Laurie Bruneau, Risk Manager; Mr. Robert Craven, District Director of Technology and Media Services; and Dr. Karen Whisnant, EdD, Acacia Elementary School's Principal. Also present, but not met with, were Ms. Stephanie Given, Room 7's Teacher, and approximately 34 fourth graders. The purpose of the site visit was to briefly look at the set-up of the room, to develop a sampling strategy, and to familiarize Mr. Ginsborg with the WiFi installation and set-up of the devices. This fourth grade classroom has 34 students with desks arranged in five groupings of six or eight students (see Figure 1A in Appendix B). Photos 1 to 3 show the set-up of Room 7.

Room 15 (directly east of Room 7) shares a common wall with Room 7 and has no deployed WiFi devices; consequently, it was selected as a control (see Figure 1B in Appendix B). Photos 4 to 6 show the set-up of the room.

There are two access points (APs) providing wireless connectivity to the Internet at 2.40 GHz for Room 7. The first AP is located in a small workroom in the northeast corner (accessible via Rooms 8 and 15). The AP is attached to the ceiling approximately six inches from the room's common wall with Room 7, which is approximately centered between the doors to Rooms 8 and 15. The second AP is in Room 6 on the north wall (common wall with Room 7) approximately 10 feet from the northwest door. There is no AP in Room 7. All APs are Cisco Aironet AP1041N (see photos 7 and 8).

During the site visit there were approximately 34 students and one teacher in Room 7. All students had Apple iPads which included a mixture of full-sized iPads (releases 2, 3, and 4) and iPad Minis. Based on initial observations, equipment for measuring EMF was ordered from Galson Laboratories and delivered to EE on March 27.

On March 29, 2013, Mr. Ginsborg; Mr. Rhys Kuzmic, MA, CAC, CLP, Industrial Hygienist; Mr. George Valverde, CSST, Industrial Hygienist; and Mr. Chris Peterson, Administrative Assistant; all from Executive Environmental (EE), met with Mr. Craven and Mr. Aaron Storey, the District's IT Technician. Mr. Storey kept streaming video on the iPads to the APs to ensure a continuous connection between the AP and devices in Room 7 – in use either flat on the desk or propped up with a stand; the readings were below the limit of detection (LOD) of the instrument used. The LOD was less than 0.1 volts per meter (V/m) which calculates out to 0.000003 milliwatts per centimeter squared. Readings collected in Room 15 – while all devices in Room 7 were in use either flat on the desk or propped up with a stand – were below the LOD of the instrument used. Readings in both Rooms 7 and 15 were below the LOD of the instrument used when all devices in Room 7 were off or "asleep"^E and when the WiFi for the entire site was shut off.

After further research and discussion with the District, it was decided to rent a much more sophisticated instrument, which could detect much lower levels of RF. A Narda Selective Radiation Meter was rented from Advanced Test Equipment Rentals (San Diego, California) and the District was asked to recreate the March set-up in Room 7 on June 13, 2013.

On June 13, Mr. Ginsborg was joined by Ms. Susan Browne Rosenberg, CIH, CHMM, CIEC, Senior Industrial Hygienist with EE. Mr. Storey and Mr. Craven assisted in setting up the devices and providing connectivity to the Internet. Ms. Given was preparing to leave for the summer break, and no students were present. She was present during portions of the sampling and provided Mr. Craven with the major applications of the Internet-accessed core curriculum she uses with her

^E All iPads and iPad Minis turned on but in sleep mode.

students. Ms. Bruneau was accompanied by Mr. Jonathan R. Lackey, MBA, ARM, Director of Property/Liability Programs for ASCIP. Mr. Bill Piazza, Environmental Assessment Coordinator for Los Angeles Unified School District, observed the measurements. Measurements on June 13 were repeated in Room 7 while devices were “asleep,” during web video streaming, and during the major Internet-accessed core curriculum. Based on these measurements, measurements were not collected in Room 15 or while the WiFi for the entire site was shut off.

All area measurements were collected using the Narda Selective Radiation Meter (SRM). The initial set of measurements was collected with all iPads and iPad Minis turned on but in “sleep” mode for background measurements. At 10:00 AM, Mr. Storey and Mr. Craven began streaming video on all 34 devices in the room. Measurements were taken of instantaneous/peak/maximum readings, along with averaged readings over time intervals from six to 360 seconds.

The last set of measurements was collected for 120 seconds on Station 15 using a tripod to set the probe at the head level of a student using the device (see photos 9 and 10). Mr. Craven used ten different applications to simulate teaching tasks that would normally be a part of the daily curriculum. During each two-minute demonstration, Mr. Craven actively interacted and typed on the iPad according to the individual program. The teaching tasks evaluated included the following:

1. Show me App – this application allows the user to record voice-over whiteboard tutorials and share them online. It records what is typed or drawn on the screen.
2. Haiku Learning Management System – this application is an on-line class
3. Brain Pop – a curricular subscription service with short animated videos that explain specific concepts. The iPad application allows users to view the featured movie of the day for free and take quizzes.
4. Keynote – Keynote for iPad is the mobile version of Apple's presentation application. It will not currently play audio or video, but it has tight integration with the images on the iPad. It can open and export PowerPoint or Keynote files and can also export as PDF.
5. iMovie – for making and editing HD movies. Can sync finished movies back to the computer or send via e-mail.
6. Google Docs – for creating documents
7. Trading Cards – allows the user to share his or her understanding of various topics to build study aids for school or to create fictional worlds of characters.
8. Toontastic – Students create an animated cartoon using puppets and student voice recordings. Follows a story arc with setup, conflict, challenge, climax, and resolution.
9. Khan Academy – allows the user to access a massive number of topics, including K-12 math and science topics such as biology, chemistry, and physics. The application used was for a math lessons.
10. Haiku Deck – this app creates on-line presentations

To evaluate power density levels when all eight devices at Pod C were running, the Khan Academy application was activated on the devices at Stations 13 to 20 for two minutes. The specific programs used were Reactions and Equilibrium, The Fiscal Cliff, More on Orbitals and Electrons, Basic Yoga, Salman Khan at TED 2011 (two devices), Duccio's Virgin and Child, and Algebra II.

IV. SURVEY PROCEDURES

During both surveys, Mr. Storey maintained a continuous stream of data (video streaming) between the tablets and the APs. EMF (RF) area measurements were also collected approximately one meter away from the APs on both survey days.

March 29, 2013: EMF (RF) monitoring utilized a Holaday Broadband RF Meter Model 4416 (serial number 0007533 equipped with Holaday 4433 MSE Isotropic Probe (serial number 00070028.) The meter and the probe were provided by Ashstead Rentals through Galson Laboratories. Both the meter and the probe were calibrated by Ashstead through ETS-Lindgren on February 28, 2013. The probe has a frequency response range of 300 megahertz (MHz) to 5 GHz (5,000 MHz). Measurements were collected as volts per meter (V/m) because of the increased sensitivity. Field measurements in V/m were converted to mW/cm² by the following mathematical relationship:

Equation 1:
$$mW/cm^2 = \frac{[(V/m)^2]}{3770}$$

The sampling plan on March 29 was to measure EMF (RF) power in V/m and to convert to power density using Equation 1 (above) in Room 7 (Part 1) and in Room 15 (Part 2).

Part 1: Measurements were collected in Room 7 (see Figure 1A in Appendix B, Locations 1 to 37) at each student desk with (1) the devices on and connected to the WiFi streaming a video, (2) the devices on and not connected to the WiFi, and (3) with the devices turned off. Room 7 measurements will be collected in the following configurations and locations:

- With devices flat on the desk – above the center of the device and below the desk
- With devices tilted on desktop – front, back, left, right, top, and below the desk.
- With the site WiFi shut off.

Part 2: Measurements were collected in Room 15 (see Figure 1B in Appendix B, Locations A to H) from representative distances from the access points – both above likely location of each student's head (about 10 to 12 inches above device) and below each desk while:

- The devices in Room 7 were flat on the desk and connected to the WiFi streaming a video
- The devices in Room 7 were tilted on desktop and connected to the WiFi streaming a video
- The devices in Room 7 were off
- With the site WiFi shut-off

June 13, 2013: The June 13 EMF (RF) monitoring was conducted with a Narda Selective Radiation Meter (SRM3006/107; serial number D-0151) equipped with Narda 27MHz-3GHz Antenna, (3501/03; serial number K-0323) connected by a Narda Optic Cable (serial number AA-0294). The meter, antenna, and cable were calibrated by ATEC Corporation on January 17, 2013. The probe (antenna) has a response range of 27 megahertz (MHz) to 3 GHz (3,000 MHz). This device was focused to 2.35 to 2.55 GHz frequency with a centerline frequency of 2.45. The Cisco Systems wireless AP and devices function in the frequency range of 2.4 to 2.5 GHz (IEEE 802.11). The frequency center was 2.45 GHz, and the majority of the transmission ranged from 2.41 to 2.48 GHz.

EMF area measurements were taken in the classroom around each pod of student desks and three teacher locations, at approximately ten to twelve inches from iPads to simulate exposure to the head and brain. Based on the measurements obtained, it was not necessary to replicate Part 1 in its entirety, and no measurements were collected in Room 15.

V. RESULTS

The sampling results indicate that exposures to EMF in Room 7 were **well below** the IEMFA and FCC recommendations. There are currently no state or federal regulations relating to EMF exposure.

Results of this study are compared to:

- International Electromagnetic Fields Alliance (IEMFA) “Seletun Statement” published February 3, 2011, from the Seletun Statement published by the International Electromagnetic Fields Alliance (IEMFA)^F.
- BioInitiative 2012 and 2007 Reports^G.
- Los Angeles Unified School District Precautionary Threshold Level^H of 0.1 $\mu\text{W}/\text{cm}^2$.
- Federal Communications Commission Office of Engineering & Technology Maximum Permissible Exposure Limits OET Bulletin 65, Edition 97-01.

The IEMFA recommendations and BioInitiative Report are not government regulations. The IEMFA recommends a provisional whole-body exposure limit of 0.17 $\mu\text{W}/\text{cm}^2$. These levels are also well below the 10-fold lower precautionary limit of 0.017 $\mu\text{W}/\text{cm}^2$.

The 2007 BioInitiative Report recommends a cautionary level of 0.1 $\mu\text{W}/\text{cm}^2$. The 2012 BioInitiative Report suggests applying safety buffers based on cell phone studies to protect sensitive populations in the extremely low range of 0.003 to 0.006 $\mu\text{W}/\text{cm}^2$.

Monitoring results are listed in Table I starting on the following page.
The remainder of the page is blank.

^F <http://iemfa.org>

^G <http://www.bioinitiative.org>

^H http://www.lausd-oehs.org/docs/Misc/Radiofrequency_Safety_Fact_Sheet_021113a.pdf

**Table I – Electric and Magnetic Field Measurements
Radio Frequency (RF) Range 2.35 to 2.55 Gigahertz (GHz)
Acacia Elementary School, Room 7
June 13, 2013**

Time/Location (see Appendix B) and Activity	Radio Frequency		
	Maximum Peak Measurement in microwatts/square centimeter ($\mu\text{W}/\text{cm}^2$)	Average Measurement in microwatts/square centimeter ($\mu\text{W}/\text{cm}^2$)	Average Measurement (duration in seconds)
9:49 AM/Pod A center of table iPads on but in sleep mode	0.00149	0.00000281	6
9:50 AM/Pod B center of table iPads on but in sleep mode	0.001211	0.00000250	6
9:51 AM/Pod C center of table iPads on but in sleep mode	0.0006668	0.000001596	6
9:52 AM/Pod D center of table iPads on but in sleep mode	0.006432	0.0000173	6
9:54 AM/Pod E center of table iPads on but in sleep mode	0.00001236	0.000001383	6
9:55 AM/Pod F center of table iPads on but in sleep mode	0.001698	0.000001713	6
9:56 AM/Pod G center of table iPads on but in sleep mode	0.0008437	0.000001578	6
9:57 AM/Pod H center of table iPads on but in sleep mode	0.0003274	0.000001596	6
10:03 AM/Pod A center of table iPads all devices streaming	0.002795	0.000002159	6
10:04 AM/Pod B center of table iPads all devices streaming	0.0001796	0.000001557	6
10:04 AM/Pod C center of table iPads all devices streaming	0.0003342	0.000001458	6
10:05 AM/Pod D center of table iPads all devices streaming	0.000212	0.000002159	6
10:05 AM/Pod E center of table iPads all devices streaming	0.0007531	0.0000016	6
10:12 AM/Pod F center of table iPads all devices streaming	0.003549	0.000001607	6
10:13 AM/Pod G center of table iPads all devices streaming	0.0001862	0.000001333	6
10:14 AM/Pod H center of table iPads all devices streaming	0.0002697	0.000001682	6

**Table I – Electric and Magnetic Field Measurements (continued)
Radio Frequency (RF) Range 2.35 to 2.55 Gigahertz (GHz)
Acacia Elementary School, Room 7
June 13, 2013**

Time/Location (see Appendix B) and Activity	Radio Frequency		
	Maximum Peak Measurement in microwatts/square centimeter ($\mu\text{W}/\text{cm}^2$)	Average Measurement in microwatts/square centimeter ($\mu\text{W}/\text{cm}^2$)	Average Measurement (duration in seconds)
10:15 AM/C16 iPad mini at head level	0.000490	0.000001482	6
10:16 AM/D28 iPad at head level	0.001196	0.000001489	6
10:17 AM/E33 iPad at head level	0.000792	0.000001374	6
10:18 AM/A5 iPad at head level	0.000755	0.000001684	6
10:19 AM/B12 iPad mini at head level	0.002814	0.000003547	6
10:20 AM/B8 iPad at head level	0.002712	0.000002410	6
10:21 AM/D24 iPad mini at head level	0.000278	0.000001299	6
10:32 AM/E33 iPad at head level (see tripod in Photo 10)	0.004862	0.000001683	360
10:41 AM/C16 iPad mini at head level	0.000895	0.000002430	360
10:55 AM/C16 iPad mini at head level	0.00474	0.000001370	120
11:00 AM/C16 iPad mini at head level	0.007850	0.000001445	120

**Table I – Electric and Magnetic Field Measurements (continued)
Radio Frequency (RF) Range 2.35 to 2.55 Gigahertz (GHz)
Acacia Elementary School, Room 7
June 13, 2013**

Time/Location (see map) Teaching Task Activity Application	Radio Frequency		
	Maximum Peak Measurement in microwatts/square centimeter ($\mu\text{W}/\text{cm}^2$)	Average Measurement in microwatts/square centimeter ($\mu\text{W}/\text{cm}^2$)	Average Measurement in seconds (duration in seconds)
11:25 AM/C15 iPad, head level, Show Me App	0.000947	0.000001020	120
12:00 PM/C15 iPad head level, Haiku Learning Mgmt System	0.000965	0.000001132	120
12:02 PM/C15 iPad head level, Brain Pop App	0.001432	0.000001399	120
12:06 PM/C15 iPad head level, Keynote	0.001266	0.000002144	120
12:08 PM/C15 iPad head level, iMovie	0.00147	0.000001158	120
12:14 PM/C15 iPad head level, Google Docs	0.002023	0.000001344	120
12:17 PM/C15 iPad head level, Trading Cards	0.002197	0.000001753	120
12:21 PM/C15 iPad head level, ToonTastic	0.002805	0.000001334	120
12:24 PM/C15 iPad head level, Khan Academy	0.003005	0.000001580	120
12:27 PM/C15 iPad head level, Haiku Deck	0.001546	0.000001370	120
12:35 PM/C15 iPad head level, Khan Academy running on all 8 iPads on Student Desk Pod C	0.001649	0.000000971	120

VI. DISCUSSION

AREA ELECTRIC AND MAGNETIC FIELD EXPOSURE MEASUREMENTS

According to the National Institute of Environmental Health Sciences (NIEHS)¹:

Electric and magnetic fields (EMFs) are invisible lines of force associated with the production, transmission, and use of electric power such as those associated with high-voltage transmission lines, secondary power lines, and electrical wiring and lighting. Electric and magnetic fields also arise from the motors and heating coils found in electronic equipment and appliances. The type of energy produced by wifi networks is characterized by NIEHS as “Non-ionizing: low-level radiation which is generally perceived as harmless to humans.”

Because the use of electric power is so widespread, humans are constantly exposed to electric and magnetic fields. Studies conducted in the 1980s appeared to show a link between magnetic field strength and the risk of childhood leukemia. After reviewing more than two decades of research in this area, NIEHS scientists have concluded that the overall pattern of results suggests a weak association between increasing exposure to EMFs and an increased risk of childhood leukemia. The few studies that have been conducted on adult exposures show no evidence of a link between residential EMF exposure and adult cancers, including leukemia, brain cancer, and breast cancer. Because research is still ongoing, the NIEHS recommends continued education on practical ways of reducing exposures to EMFs.

According to the Federal Communication Commission²:

Biological effects can result from exposure to RF energy. Biological effects that result from heating of tissue by RF energy are often referred to as "thermal" effects. It has been known for many years that exposure to very high levels of RF radiation can be harmful due to the ability of RF energy to heat biological tissue rapidly. This is the principle by which microwave ovens cook food. Exposure to very high RF intensities can result in heating of biological tissue and an increase in body temperature. Tissue damage in humans could occur during exposure to high RF levels because of the body's inability to cope with or dissipate the excessive heat that could be generated. Two areas of the body, the eyes and the testes, are particularly vulnerable to RF heating because of the relative lack of available blood flow to dissipate the excess heat load.

At relatively low levels of exposure to RF radiation, i.e., levels lower than those that would produce significant heating; the evidence for production of harmful biological effects is ambiguous and unproven. Such effects, if they exist, have been referred to as "non-thermal" effects. A number of reports have appeared in the scientific literature describing the observation of a range of biological effects resulting from exposure to low-levels of RF energy. However, in most cases, further experimental research has been unable to reproduce these effects. Furthermore, since much of the research is not done on whole bodies (in vivo), there has been no determination that such effects constitute a human health hazard. It is generally agreed that

¹ <http://www.niehs.nih.gov/health/topics/agents/emf/> (website accessed June 20, 2013).

² Federal Communications Commission, Office of Engineering & Technology, “Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields”, OET BULLETIN 56, Fourth Edition. August 1999

further research is needed to determine the generality of such effects and their possible relevance, if any, to human health. In the meantime, standards-setting organizations and government agencies continue to monitor the latest experimental findings to confirm their validity and determine whether changes in safety limits are needed to protect human health.

In terms of potential EMF (RF) interference with medical devices, the United States Food and Drug Administration (USFDA) Center for Devices and Radiological Health (CDRH) has raised a concern that low levels of EMF (RF) may potentially interfere with medical devices, electric wheel chairs, and motorized scooters^K. The CDRH continues to research the issue and provide notifications to clinicians and manufacturers. The CDRH is developing guidelines for manufacturers for electromagnetic compatibility (EMC). As these guidelines are developed and implemented, the manufacturers will ultimately be responsible for their device's EMC. Until these guidelines are developed and implemented, the users of electronic medical devices, electric wheel chairs, and motorized scooters should check with their physician as to possible effects of EMC when in proximity to wireless equipment.

In general, EMF levels decrease rapidly in inverse proportion to the distance. A ten-fold decrease is created by stepping one to two feet away from electrical equipment. In general, standing an arms length away from video display terminals or an electrical appliance such as a microwave will significantly reduce EMF exposure.

Peak (instantaneous) power density measurements in Room 7 were below 0.01 $\mu\text{W}/\text{cm}^2$ and all average levels (except one reading), ranging from six seconds to six minutes, were below 0.000004 $\mu\text{W}/\text{cm}^2$. One six-second average reading at Pod D prior to video streaming (devices were in "sleep" mode) measured 0.000017 $\mu\text{W}/\text{cm}^2$.

VII. RECOMMENDATIONS

- 13-06-A Continue to evaluate ongoing WiFi research and apply to the District's programs as appropriate to the information identified.
- 13-06-B Continue to use devices that conform to the IEEE 802.11 Standard (and subsequent revisions) and devices approved for home and office by the FCC or subsequent United States regulators.
- 13-06-C Re-evaluate existing data and potential exposure when the FCC or other United States regulator promulgates a standard that is below the existing FCC Maximum Permissible Exposure Limits for general population/uncontrolled exposure for devices functioning in the 1.5 to 100 GHz range.
- 13-06-D Consider re-testing Rooms 7 and 15 during student occupancy and while all students are using the tablets (iPads) in a actual class lesson in Room 7. Re-testing should be done with a Narda SEM equipped with isotropic antenna (probe) that can measure frequencies in the range 2.35 to 2.55 GHz. EE can assist with this if needed.
- 13-06-E Provide employees represented by this study with access to this report and the results contained herein, in accordance with 8 CCR 3204(e).

^K United States Food and Drug Administration guidance document, "Medical Devices and EMI: The FDA Perspective" <http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/ucm106367.htm>

VIII. DISCLAIMER

All reports and recommendations are based on conditions and practices observed and information made available to Executive Environmental (EE) by the client and the designated sites/facilities on the days sampling was conducted. This report does not purport to set forth all hazards, nor to indicate that other hazards do not exist. No responsibility is assumed by EE for the control or correction of conditions or practices existing at the facilities, or at any other premises surveyed by EE, for and on the behalf of the client. Services provided by EE shall be governed by the standard of practice for professional services measured at the time those services are rendered.

Consulting services and/or other products or recommendations provided as a part of this engagement, which may be provided all or in part by an ASCIP contractor (EE) as a benefit of JPA membership, do not and are not intended to assume, take the place of, or relieve any other insurance program or responsible party of any duty, obligation, or responsibility to respond to or provide benefits on behalf of its client. Where a client has insurance coverage other than ASCIP, or where a responsible party is identified at the time such services, products, or recommendations are desired, the client should first contact that insurer or responsible party to request such assistance and to provide them with an opportunity to respond in an appropriate manner.

Appendix A

Photograph Log
June 13, 2013



Photo 1 – Room 7, view from entry door to the southeast corner and doorway to Room 15. Typical location of devices (mixture of iPads and iPad Minis). Table D is in the foreground.



Photo 2 – Room 7, view from entry door to the northeast corner and workroom in the northeast corner accessible from Rooms 8 and 15. Typical location of devices.



Photo 3 – Room 7, view from entry door to the northwest corner and door to Room 8. Typical deployment of devices on desks.



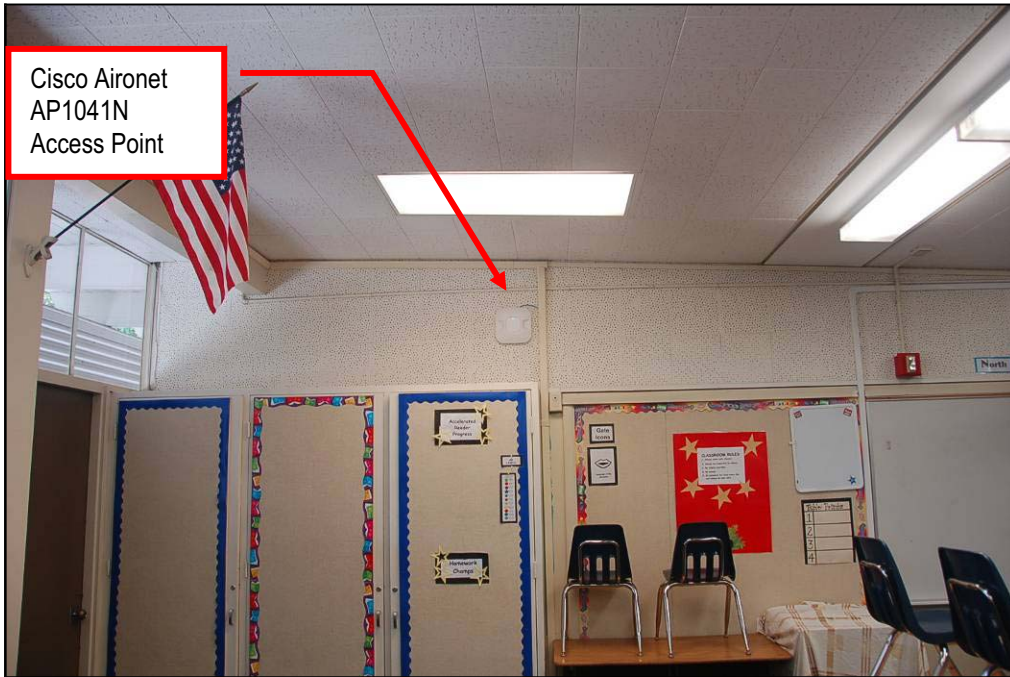
Photo 4 – Room 15, view from entry door to the southwest corner and doorway to Room 7. Typical classroom with no WiFi devices in use.



Photo 5 – Room 15, view from entry door to the northwest corner and workroom in the northwest corner accessible from Rooms 8 and 15. Typical classroom with no WiFi devices in use.

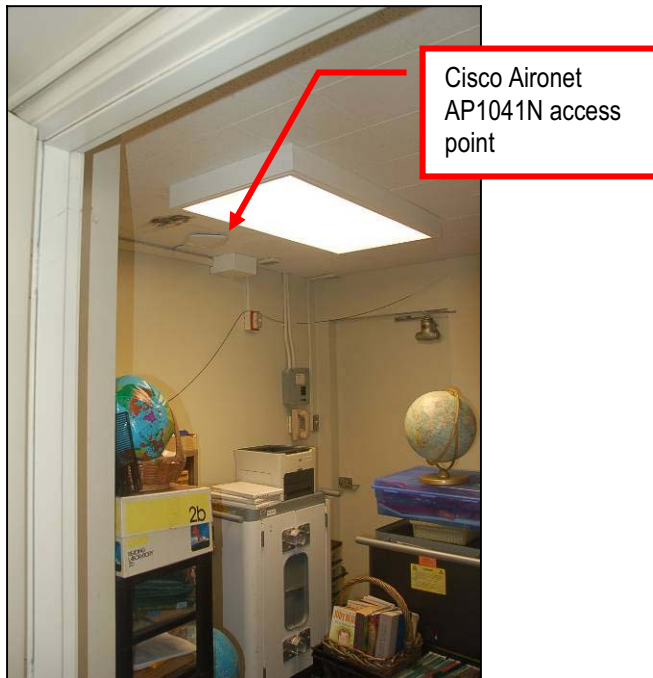


Photo 6 – Room 15, view from entry door to the southeast corner. Typical classroom with no WiFi devices in use.



Cisco Aironet
AP1041N
Access Point

Photo 7 – Room 6, common wall between Rooms 6 and 7 with Cisco Aironet AP1041N access point.



Cisco Aironet
AP1041N access
point

Photo 8 – Workroom accessible from Rooms 8 and 15, view from Room 15 towards door to Room 8. Cisco Aironet AP1041N access point is mounted on the ceiling. Historical water-damaged ceiling tiles should be replaced and source of moisture intrusion should be verified and eliminated.



Photo 9 – Room 7, typical device deployment. Area depicted is Pod C (see Figure 1A in Appendix B). Common core measurements were collected at this table.

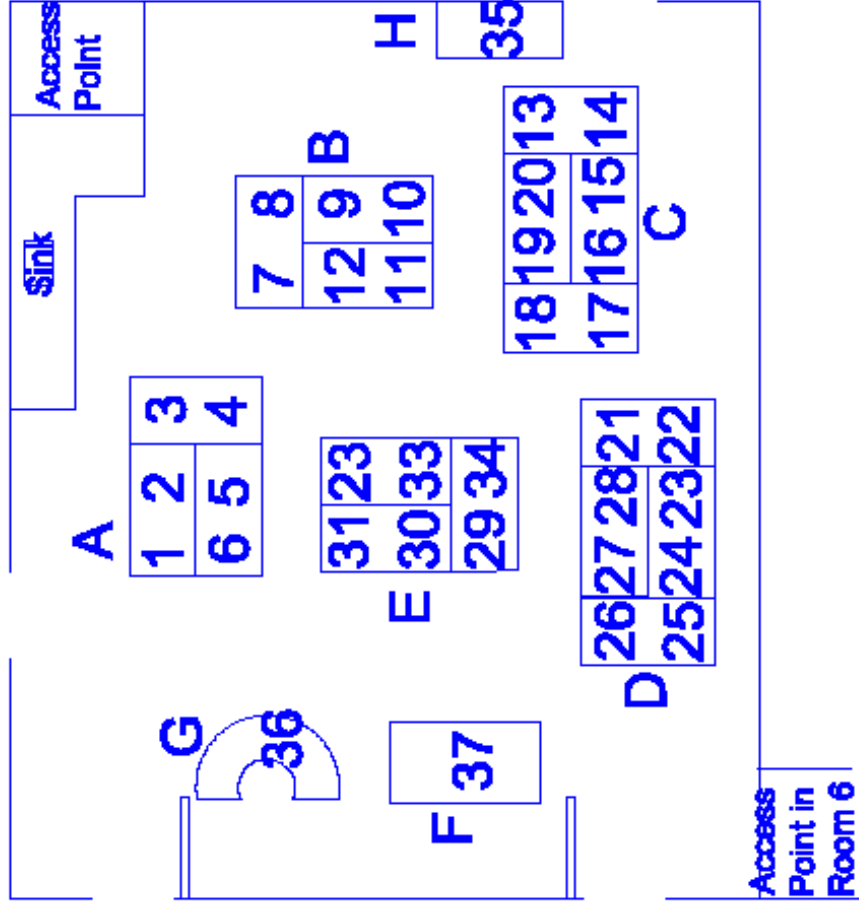


Photo 10 – Room 7, typical instrument antenna placement for measurements. Approximately 10 to 12 inches from device, representing likely location of a child's head in relationship to the device.

Appendix B

Figures

Room 7



Notes:

Letters A-H:
Area Measurements

Numbers 1-34:
Students' Desks

Numbers 35-37:
Teachers' Desks

Client: ASCIP/Fullerton USD



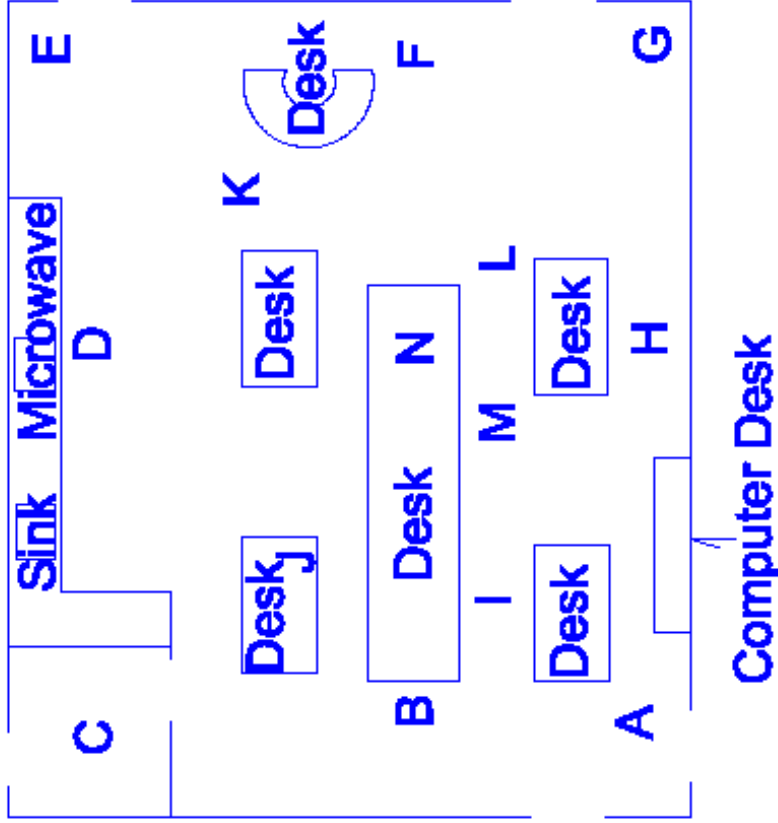
EXECUTIVE ENVIRONMENTAL
HEALTH & SAFETY SIMPLIFIED

Project #: 13-A0043-0054

Info: Room 7

Site: Azucita ES
1200 North Azucita Avenue
Address: Fullerton, California 92831

Room 15



Client: ASCIP/Fullerton USD	Project #: 13-A0043-0054	Info: Room 18
		Site: Acacia ES Address: 1200 North Acacia Avenue Fullerton, California 92831