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Dear Head Teachers, Governors and Local Authorities,

Below you will find responses from **SSITA** to the statements made by Public Health England, about the safety of Wi-Fi technology for use in schools. As employers, you are responsible for providing a safe school environment; the responses below can be considered alongside the advice given to you by Public Health England (PHE). We also realise that all schools have a legal duty to safeguard children by preventing any impairment to their health and development. We believe that the information below will usefully assist you when fulfilling these legal requirements.

SSITA Comments on the Key points from PHE: (these are in red underlined text below)

- There is no consistent evidence to date that exposure to RF signals from Wi-Fi and WLANs adversely affect the health of the general population.

For science to find evidence “consistent”, or not, the studies being compared need to be investigating exactly the same conditions, species/strain/sex, prior exposures and methodologies. The statement above is misleading because it implies that the reader can dismiss concerns of harm because identical studies have failed to give the same results. In reality, many studies have found damage or adverse effects in humans/human cells or other animals from Wi-Fi/2.4GHz wireless signals. Ten studies listed in the link here: <http://wifiinschools.org.uk/30.html> have found increased oxidative stress in animal or human cells from Wi-Fi/2.4GHz signals. Increased oxidative stress is known to lead to damage of proteins, lipid membranes and nucleic acids and increases the risk of cancer. Five studies in the link above found adverse effects of Wi-Fi/2.4GHz on fertility or reproductive success. Two studies found changes in human electrical brain activity as a result of exposure to Wi-Fi/2.4GHz signals and two found abnormal human heart rates in some people. These studies, backed up by many more carried out on mobile phones and other radiofrequency (RF) signals, are enough to raise serious concerns about the safety of Wi-Fi for use in schools.

However, even if a scientifically accurate definition of the word “consistent” is used, **SSITA** believes that we neither need nor should wait for totally “consistent” evidence. We are never likely to get such “consistent” evidence as people, the technologies and our use of them are so varied.

Complete consistency is not required for action to be taken:

European Commission Communication on the Precautionary Principle 2nd February 2000

“The precautionary principle applies where scientific evidence is insufficient, inconclusive or uncertain and preliminary scientific evaluation indicates that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health may be inconsistent with the high level of protection chosen.”

http://europa.eu/legislation_summaries/internal_market/single_market_for_goods/technical_harmonisation/l32042_en.htm

and: http://ec.europa.eu/dgs/health_consumer/library/pub/pub07_en.pdf

The precautionary principle is detailed in Article 191 of the Treaty on the Functioning of the European Union. It aims at ensuring a higher level of environmental protection through preventative decision-taking in the case of risk to human, animal and plant health.

According to the Commission the precautionary principle may be invoked when a phenomenon, product or process **may** have a dangerous effect, identified by a scientific and objective evaluation, specifically **if this evaluation does not allow the risk to be determined with sufficient certainty.**

The precautionary principle may only be invoked when the **three preliminary conditions** are met:

- identification of potentially adverse effects;

These have been well identified and recorded in the literature. There are many thousands of peer-reviewed studies in the scientific literature demonstrating both biological effects, adverse health effects and adverse effects on concentration, memory and behaviour due to RF exposure. There are more positive studies showing effects than negative ones showing no effects – and, anyway, one negative one does not cancel a positive one – the different results just show the variability in the data and suggest issues with methodology. The ‘Safe Schools 2012’ (Medical and Scientific Experts Call for Safe Technologies in Schools; <http://wifiinschools.org.uk/resources/safeschools2012.pdf>) published by www.wifiinschools.org.uk gives a useful over-view of the assessments of many relevant organisations and experts from around the world.

- **evaluation of the scientific data available;**

The two BioInitiative Reports give a great deal of useful detail. Many scientific and medical organisations are expressing concerns in writing about biological and adverse effects on well-being from modern wireless devices. The World Health Organisation’s International Agency for Research on Cancer (IARC) classified RF radiation as a Group 2B “possible human carcinogen” in 2011. Public Health England (PHE) has commented:

“Among all of these [IARC] classifications are many widespread and familiar substances/situations, including coffee and pickled vegetables (Group 2B), shift working that involves circadian disruption (Group 2A) and alcohol (Group 1).”

This is a disingenuous comment from PHE. The only other 2B agent that our exposure to is regularly ignored in most countries are elevated levels of mains electricity (ELF) magnetic fields (EMFs) that were classified as 2B by IARC in 2002.

“Coffee is also classed as 2B”. Yes it is, but that is with regard to drinking lots of strong coffee per day and most children don’t drink coffee before their late teenage years. Nor do we force children to drink coffee at school or eat pickled vegetables throughout every school day (and against the expressed wishes of their parents). Our exposure to most other 2B agents is already restricted as they are known to be toxic in other ways than as a carcinogen. It should be remembered that ionising radiation and human papillomavirus (HPV) are examples of Group 1 (proven human carcinogens) that are effectively undetectable by us in our everyday lives and produce no immediate effects in most people – yet are accepted as known causes of cancer.

- **the extent of scientific uncertainty.**

It is important to remember that the Precautionary Principle (PP) specifically and only applies when the data and evaluation are NOT certain. If they become “consistent” then other due processes take over to usually require prevention by law. The PP is applied at an earlier stage to prevent unnecessary harm.

The precautionary principle shall be informed by **three specific principles**:

- the fullest possible scientific evaluation, the determination, as far as possible, of the degree of scientific uncertainty;
- a risk evaluation and an evaluation of the potential consequences of inaction;
- **the participation of all interested parties in the study of precautionary measures**, once the results of the scientific evaluation and/or the risk evaluation are available.

In addition, the **general principles** of risk management remain applicable when the precautionary principle is invoked. These are the following five principles:

- proportionality between the measures taken and the chosen level of protection;
SSITA believes that Information Technology is important in modern schooling, especially at secondary level and also in the higher classes in primary schools. For most applications **SSITA** supports the use of fixed desktop, hardwired PC computers with a good quality ergonomic keyboard and mouse, with a flat-screen display and a hard-wired (Ethernet or fibre optic) network connection. These are 'Earthed' and do not use wireless and expose the user to minimal (but not non-existent) electromagnetic fields.
There is a place for occasional use of non-wireless laptops but the EMF exposures (from touchpad, etc) are higher and the keyboard is much less ergonomic and more likely to lead to repetitive strain injury (RSI) problems in later years (small light finger and wrist movements).
Tablets and Smart Phones should not be used as both result in much higher electromagnetic field (EMF) and RF exposure to the children.
SSITA believes that this approach would be both proportionate and protective at very little difference in cost.
- non-discrimination in application of the measures;
- consistency of the measures with similar measures already taken in similar situations or using similar approaches;
- examination of the benefits and costs of action or lack of action;
Although a hard-wired installation is slightly more expensive to install, ongoing maintenance and replacements would be significantly cheaper.
SSITA believes that lack of precautionary action will lead to long-term harm to the physical and mental wellbeing of the children exposed on a daily basis to Wi-Fi, Tablet computers and the like.
- review of the measures in the light of scientific developments.

The burden of proof

In most cases, European consumers and the associations which represent them must demonstrate the danger associated with a procedure or a product placed on the market, except for medicines, pesticides and food additives.

However, in the case of an action being taken under the precautionary principle, the producer, manufacturer or importer may be required to prove the absence of danger.

K. Dane Snowden, Vice President, External & State affairs of the Cellular Telecommunications Industry Association (CTIA) formally stated in 2012 at a Californian hearing:

"Let me be very clear. The Industry has NOT said once, ONCE, that cell phones are safe".

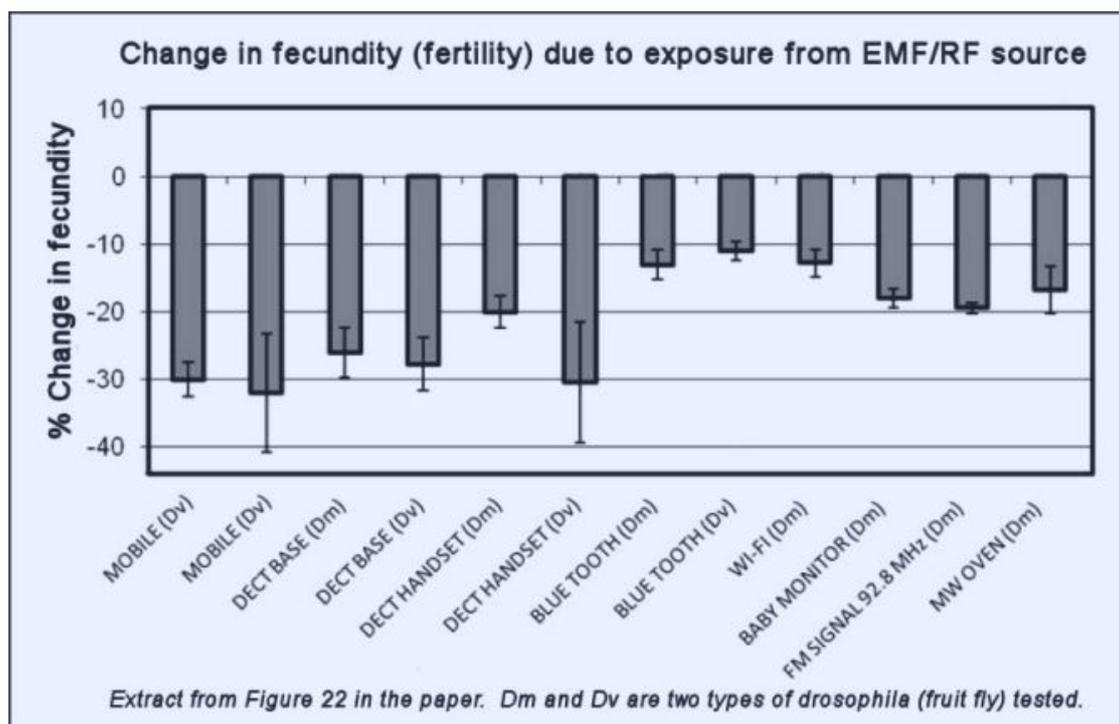
- The signals from Wi-Fi are very low power, typically 0.1 watt (100 milliwatts), in both the computer and the mast (or router) and resulting exposures should be well within internationally-accepted guidelines.

The signals are within ICNIRP Guidelines – but **SSITA** and many others dispute the relevance of guidance primarily based on heating effects (Specific Absorption Rate or SAR) over 6 minutes when there are many good, peer-reviewed, scientific studies showing evidence of harm, especially to well-being, *thousands of times lower* than the ICNIRP Guidance values.

Moreover, it does not matter if the signals are low power, if they are enough to cause biological damage and adverse effects, as they have been found to do (<http://wifiinschools.org.uk/30.html>).

- The frequencies used are broadly the same as those from other RF applications.

This is true, but most humans were not generally exposed to significant levels of signals at these frequencies before the last 30 years. Levels in this part of the radio-frequency spectrum have increase by at least 1,000,000,000,000,000-fold in the last 100 years and by about 1,000,000-fold in the last 30 years alone. Many studies have been carried out on insects, birds, other animals and plants that are showing adverse effects. These are not psychosomatic. A recent example is shown:



From: Margaritis LH, et al, Drosophila oogenesis as a bio-marker responding to EMF sources. Electromagnetic Biology and Medicine, July 2013.

- [Based on current knowledge, RF exposures from Wi-Fi are likely to be lower than those from mobile phones.](#)

This is a ridiculously ignorant statement by PHE who have not even formally assessed and published exposure from iPads and other wireless tablet computers. For their assessment of exposures Peyman, *et al*, only measured laptop PCs and Wi-Fi/wLAN Access Points – and showed that the typical levels in the classroom were significantly higher than those found 100 metres away from a mobile phone mast while standing in the main beam. They measured the levels at 0.5 and 1 metre away from the laptop PCs. **Most children use a laptop closer than 0.5 metres (about 0.3 m or 30 cm is more common).** Tablets are often held in the hand (or on a lap) with the hands actually touching the device close to its internal antennas. Even when on a table the child is usually very close to the screen – more like 20 cm. **As power increases approximately with the square of the distance to the source, this would represent an approximate 4-fold increase in the levels measured by Peyman, et al, at 50 cm from laptop PCs.**

Although **SSITA** believes that SAR is not the best metric (signal strength in volts per metre is better for pulsing signals like Wi-Fi), **let us examine the published SAR values of mobile phones and iPads:**

Taking all 432 mobile phones listed on www.sarvalues.com we find a range of maximum SAR values of 0.12 to 1.59 W/kg, with an average of 0.8 W/kg (in 10 g of tissue).

Taking 11 modern smart phones on www.sardatabase.com we get a range (in 10g of tissue) of 0.35 to 0.8 W/kg, with an **average maximum SAR of 0.42 W/kg.**

The Apple/FCC official **SAR for an iPad3 on Wi-Fi is 0.39-0.51 W/kg** in 10 g of tissue (and unlike mobile phones this more than doubles to 1.19 W/kg in 1g of tissue due to the way the iPad is used).

So, the max Wi-Fi SARs from iPads are very similar to those from modern mobile phones.

The UK Chief Medical Officers and Department of Health currently advise all children and young people under the age of 16 to use mobile phones for essential purposes only. The SAR values above suggest that this advice should also apply to wireless tablet computers.

But that is only a small part of the issue. All modern phones employ Adaptive Power Control (APC). This lowers their power when they have a good connection to a base station. GSM handsets have a 1000:1 range of control and typically operate between 10 and 100 times lower than their maximum. Modern 3G/UMTS handsets have a 50,000,000:1 range of power control and typically work at around one-thousandth of their maximum power. So their average SAR exposure is a tiny fraction of their maximum SAR value.

HOWEVER, iPads, other tablets and most laptops do not have any implementation of APC on Wi-Fi – so they work at their full power all the time when on Wi-Fi. There are gaps between data bursts, especially when not downloading lots of data, but the microwave data-bursts are always at full power. There is a proximity sensor on the back of iPads that Apple claims senses when it is used on a lap and decreases the transmit power to avoid breaking the SAR regulations. However, this does not work when the iPad is used on a table and a child's face is close to the screen.

SSITA believes that it is this constant hammering effect of RF radiation bursts that is particularly interfering with the user's wellbeing. There are wLAN Access Points available from some upmarket suppliers (like CISCO) that can implement APC for Wi-Fi, but even if these are installed they cannot use

APC with most tablets (including iPads) and laptop PCs currently in use in schools. That would require a substantial new investment and no use of iPads.

- On the basis of current scientific information, exposures from Wi-Fi equipment satisfy international guidelines. There is no consistent evidence of health effects from RF exposures below guideline levels and no reason why schools and others should not use Wi-Fi equipment.

SSITA strongly refutes the views expressed in this statement.

There are good reasons why schools should not use Wi-Fi equipment. Schools should not use Wi-Fi because they have a legal duty to safeguard children by preventing the impairment of children's health and development. Scientific studies have found that Wi-Fi/2.4GHz wireless signals can increase oxidative stress (which damages cells), damage DNA (which may lead to mutations, cell death or cancers), increase the proliferation of human leukaemia cells, alter human brain activity (and thus likely to affect brain development) and damage male and female fertility.

An obvious response to the evidence of damage from RF signals published in the scientific literature, would be to investigate further with biological tests the extent to which Wi-Fi signals are causing biological damage and under what conditions these effects occur. Even though PHE/HPA advise schools throughout the UK with confidence that there is no reason why Wi-Fi should not be used in schools, they have yet to publish any of their own biological or health studies into the possible effects of Wi-Fi. We also note that the Government funding of the Peyman *et al* study specifically excluded any investigations into possible adverse health effects (including on well-being). Surely schools should be questioning why PHE/HPA have carried out no biological or health studies into the effects of Wi-Fi since they announced in 2007 that they would be thoroughly investigating the safety of Wi-Fi for use in schools. All the investigation did was to measure signal levels and to state that these were below ICNIRP Guidance values.

This response has been prepared for *SSITA* by *SSITA* members:

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