

**Observations on EMR Pollution, EHS, and the Problems of
the use of the ICNIRP Guidelines in Ireland**

by
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Preface

This work has been produced as a response to the ongoing situation regarding apparent ignorance of the hazardous nature of electromagnetic radiation and the fields around all types of emitters including the ESB distribution system; the current public outcry and resultant debate concerning ill-advised location of cellphone base stations towers with their placement directly on or adjacent to hospitals, schools, other public buildings, and their co-location on Garda towers in the center of inhabited areas, thus ensuring maximum exposure of the population at large; and the tragically inappropriate medical treatment that many EHS sufferers have received in Ireland.

Opinion

In my opinion, the concerns being raised about the use of cell-phones, location of base stations and health effects of this technology are but the tip of a large iceberg and any new investigation by the Dail will need to be more wide ranging in its scope. A new investigative committee should be formed with a mandate to investigate not only the three areas of Communications, Health and Environment but also to look at all aspects of the use of EMR¹ and its impact within the state.

The Murkey Background of the ICNIRP² Guidelines

Bioelectric effects have been known for almost four hundred years³ with much of the early research in the twentieth century performed in the USSR. Early pioneers such as Andrew A. Marino, Robert O Becker and Allan H Frey in the US persevered for years despite the systematic obstruction of their efforts orchestrated at the very highest levels⁴. In the US, the military-industrial complex combined with a co-opted academia wished to maintain unfettered use of EMR. This gave them also a continual flow of wealth from the investigation, exploitation, deployment and use of EMR at power levels and for new uses without consideration of the health implications of EMR non-thermal effects. The existences of non-thermal effects were not just denied but any investigation of possible effects was actively discouraged. Positive findings were suppressed by their being rejected for publication.

¹Electromagnetic Radiation

²International Committee for Non-Ionizing Radiation Protection

³For an extensive discussion of the history and origins of Electrobiolgy, see: Electromagnetism and Life, Robert O Becker & Andrew A Marino 1982, Part 1. The Body Electric, Robert O Becker and Gary Selden, 1985.

⁴ For discussion of institutionalized obstruction see: The Body Electric, Robert O Becker and Gary Selden, 1985. Well worth the read. (dja.)

Both US and UK researchers, reported difficulties in reproducing the biological effects observed by the USSR researchers. Most troubling of these was the impossibility of reproducing in enough detail the exact conditions of the original experiments. The underlying problem here - - failing to document in sufficient detail exact conditions which apply to each experiment - -persists to this day, despite fifty years of such experiments. And it is this failure to reproduce some of the reported bio-effects that fuels the arguments of skeptics in their continual denial of non-thermal effects.

The current ICNIRP Guidelines have been discredited by the research of the late Neil Cherry and Gerry Hyland, among others. Their primary criticism is that the committee involved in drafting them had failed to take any effects other than heating into account including the state of being alive⁵.

The ICNIRP itself originated as an offshoot of an association, or more accurately an “old boys’ club”, composed of radiographers and health physicists which was set up to deal with safe working practices in the use of ionizing radiation in hospitals and the nuclear community in the aftermath of WW2⁶. A big number of UK/US atomic energy and military people were also members as they were the only ones with experience in the field at that time.

During the late 1940’s and early 1950’s due to the increased use of EMR including microwave energy for medical heating purposes (known as diathermy), a sub committee was set up to establish safe working practices while exposed to this 1930/1940’s technology. Thus the IRPA⁷, as it was then known, got involved in the drafting of RF⁸ safety standards.

Concurrently, the ASA⁹ were also drafting RF safety standards. The IRE¹⁰, a forerunner of the IEEE¹¹, also had established guidelines for working around “hot” masts, Radio, TV and other. At the same time, the US military commissioned its own research as it started to use newer modulation techniques and higher frequencies beyond the limits of the civil standards. Many members of the military, acting in their capacity as members of IRE were involved in the work of setting civil standards. Thus they helped to push the “thermal effects

⁵ It has been found, (Hyland and others), that the results of EMR related experiments on whole living creatures, differ from those conducted on “cultures” or dismembered creatures. Thus the state of being “whole” and “alive” is an important and relevant experimental parameter.

⁶ WW2 - The 1939 to 1945 Anti-Nazi war between the United Nations and the Axis Powers.

⁷ International Radiological Protection Association.

⁸ Radio Frequency that is the frequencies normally used for radio or wireless telegraphy, nominally 10Khz to some 2400Ghz.

⁹ American Standards Association.

¹⁰ Institute of Radio Engineers.

¹¹ Institute of Electrical and Electronic Engineers.

only” line of argument. Over time both the ASA and the FCC¹² adopted the IEEE standard developed by its C95.1 committee.

The EMR safety question started to move into the civil domain in North America, Western Europe and Japan in the 1970’s with the deployment of higher and higher frequencies for non-military uses. The establishment of a Pan-EU standard began to pose a significant threat to NATO’s leadership position in the post-Soviet era. The IRPA reconstituted itself in the 1990’s as an NGO¹³, the ICRP,¹⁴ and obtained accreditation to the WHO¹⁵. Concurrently, it reconstituted its RF safety sub-committee as the ICNIRP with an agenda to fight a rearguard action to maintain the high field strengths and deny that non-thermal or bioelectric effects from EMR exist. Thus the ICNIRP remains an unelected¹⁶, self-perpetuating entity, derived from the same old boys club and promulgating its same “thermal effects only” agenda. Only now it has the backing of the WHO and on this basis its “Guidelines” have been mandated as a Pan-EU standard.

Proposals for safer use of this technology

My view is that the current ICNIRPB guidelines are of the order of five to ten thousand times too high¹⁷ throughout the UHF¹⁸ and SHF¹⁹ bands (the microwave region²⁰) because they ignore known and well-documented biological effects at field strengths at and below $1\text{mW}/\text{cm}^2$.²¹ Using one ten thousandth of

¹² The FCC, the US licensing agency, fulfills a function similar to that of ComReg.

¹³ Non-Governmental Organization.

¹⁴ International Committee for Radiological Protection.

¹⁵ World Health Organization.

¹⁶ There is no external (public) input, as to the composition of this “committee”. Members are chosen from within those who are engaged in the thermal-effects only community, which guarantees that this “line” will remain the committee’s policy.

¹⁷ I have taken the view that a maximum exposure of $100\text{nW}/\text{cm}^2$ would exclude 99.999% of known EHS sufferers, and the other very small number can be protected by base station relocation, transmitter power reduction and/or screening, but A.O.T.

¹⁸ Ultra High Frequency, 300Mhz to 3Ghz or a wavelength of 1 meter to 10 centimeters.

¹⁹ Super High frequency, 3Ghz to 30Ghz or wavelengths of 10 to 1 centimeters

²⁰ The microwave region is an old and very loose term but is generally taken to cover a centimeter wavelength that is from 1 meter to 1 centimeter or 300Mhz to 30Ghz.

²¹ $1\text{mW}/\text{cm}^2$ ($0.01\text{Watts}/\text{m}^2$)

this level, that is 100nW/cm^2 ²² for a general public exposure base level and one hundred thousandth or 10nW/cm^2 ²³ as a safe maximum for a bedroom is sound and prudent practice, based on our current level of knowledge. Also, while the current ICNIRPB guidelines recognize resonant effects for an adult male human of height 1.9 meters +/- 10% there is a lack of recognition that the body parts of children, ranging from infants to adolescents, also show resonant effects that are spread throughout the frequency spectrum from 50 Mhz to 10Ghz and the severity of such effects are variable. This frequency range includes the upper VHF²⁴, UHF and SHF bands. How severe the bio-effects are, depends on time required to grow through a single resonant effect²⁵. For children the significance of these resonant effects are that under such conditions upwards of one thousand times more EMR energy is absorbed into the effected body part than under non-resonant conditions as calculated by use of the ICNIRP Guidelines and thermal-effect only procedures.

I believe that the ICNIRP Guidelines are seriously flawed; that they are at least 4,700 times too high for the 900 Mhz cellphone band and at least 9,000 times too high for the 1800Mhz cellphone band.

The primary non-thermal effect associated with EMR exposure of children is a higher than normal rate of DNA “mis-repairs” associated with cell division due to the rapidity with which cells are repeatedly dividing and the known interference with the cell repair process of EMR. Such abnormal accumulation of mis-repaired DNA while not cancer represents a predisposition to possible future cancer development.

It is for this reason that Sir William Stewart of UK-NRPB, in his second report dated December 2004, has recommended that young children do not use cellphones. I believe that there should be a concerted effort in Ireland to educate children about cellphone use. Children under twelve should be banned from using cellphones while a policy of “prudent avoidance” or “emergency use only” should be introduced for the twelve to eighteen age group. Indeed, in view of the latest data coming out of Sweden on the links between brain tumors and cellphone use, a policy of “prudent avoidance” should be extended to all age groups.

A logical way to protect users of such places as schools, nurseries, offices and domestic dwellings would be to establish a maximum value of 100 nW/cm^2 for the field strength inside these buildings and the area around them. Bedrooms however should have a maximum of 10nW/cm^2 . The onus should be on the service provider to locate towers so as to meet these reduced exposure levels. And this attention to location should be accompanied with a fallback of an enforced

²² 100nW/cm^2 (0.000001Watts/m²).

²³ 10nW/cm^2 (0.0000001 Watts/m²).

²⁴ Very High Frequency, 30 to 300Mhz or 10 to 1 meter wavelengths.

²⁵ That is the time required for a child’s body part to grow, such that it’s dimensions pass through the resonant condition. It is important to note a child may be experiencing several such effects depending on the frequencies of the ambient EMR it is exposed to at any one time.

reduction of licensed power to bring the measured levels within the limit. Only as a last resort should screening of victims rather than base station location and transmitter power reduction be employed.

For reasons similar to those outlined in the last paragraph, co-location of cell phone aeriels on existing towers is not a good idea. Such a move raises the total EMR exposure in a vicinity and results in the creation of an “RF hotspot.” What counts most in EMR pollution and developing adverse health effects to this form of pollution is the total peak EMR exposure. Thus, it is desirable to minimize the level of exposure to unnecessary EMR. To this end, a concerted effort should be made to remove all unnecessary transmitting antennas throughout the country from cities, towns and villages, and co-locate them at remote hilltop locations. Then, EMR exposure would be less hazardous for humans. Furthermore, the ambient levels of EMR pollution in towns and villages would decrease leading to a smaller number of EHS cases. Most importantly, there would be a significant alleviation of suffering and decrease in symptoms²⁶ for those affected by EMR.

A prime target for relocation would be radio towers at Garda stations and their co-located cellphone antennae. Other suitable candidates for hilltop relocations could be public utilities and services such as gas, water, fire brigades and CIE. Antennae for heavy users in the private sectors—taxies and truckers for instance—could also be moved to hilltop positions.

Due to relocation, it should be possible, to reduce the power output of each transmitter by 10 to 20 times. This would result in reduced levels of EMR pollution combined with reduced energy consumption while maintaining the service area of the user.

From a regulatory point of view I differentiate between the conscious act of being exposed to EMR radiation by operating a cellphone and the “passive exposure” to the radiation from having a base station near one’s home or place of work. Passive exposure is also experienced when one is in close proximity to a cellphone in use by a third person. I consider “passive exposure” to be a serious problem in Ireland and question if there should not be a requirement for cellphones to be switched off on entering public buildings and public transport.

The question of cell-phone base station locations and their power levels requires a more detailed set of rules. In general, no base station or microwave link should

²⁶ The symptoms of EMR as defined by the WHO are: Tingling of nerves, sleepiness, headache, dizziness, unconsciousness; pain, tightness, spasm or fibrillation in muscles; palpitation, flushing, tachycardia or edema because of impairment of the circulatory system; pressure in ears, tooth pains, tightness in chest, dyspnea, nausea, belching, burning eyes and itching, burning or prickling skin.

See also:

Rea, et al., "Electromagnetic Field Sensitivity," *Journal of Bioelectricity*, 10(1&2), 241-256. and www.ehcd.com/articles/em_sensitive.html.

be closer than 1Km from any house, school, or work space but the 10nW/cm² rule applicable to a bedroom or other sleeping space should have precedence over other requirements²⁷.

²⁷ This level of permitted exposure is based in part on the work of the late Professor Neil Cherry of Lincoln University, N.Z.

The ESH Factor

The exact mechanism by which EMR produces observed non-thermal bioeffects is still not fully understood. However, coherent detection²⁸, based on the well-known semiconductor nature of living matter, as the mechanism for EHS not only in humans and other mammals, but also throughout the natural world right down to *E.Coli* and other “simple” life forms, is widely supported. The voltages, currents and associated magnetic fields, due to a resonant-like action, build up to levels far above the energy of the incident fields, in part as the result of conversion gain associated with coherent detection. These demodulation frequencies lie within the EEG and MEG ranges that are used within living systems for signaling and feedback by the CNS²⁹. The CNS is thus exposed to false signals that it is unable to differentiate from its own internal signals and that are likely to be much stronger. The resultant non-linearity due to overloading of the CNS and other physiological malfunctions manifest as the well-known EHS symptoms.

A number of these body malfunctions -- calcium efflux, for instance -- are well documented and initial results having been successfully duplicated/reproduced in later laboratory tests they can no longer be dismissed by skeptics as experimental artifacts or just plain rubbish. Many EHS effects, however, show up only within certain combinations of power levels combined with specific carrier and modulation frequencies. This is the so-called “window” effect.

It is my conclusion that around 20% of the Irish populations are EHS to the level where it affects their lives adversely, with around 20% of those (or 4% of the total population) being severely affected by EHS, to the point where it incapacitates them and totally disrupts their lives.

²⁸ *Coherent detection*, also known as synchronous or direct conversion, is a process by which the envelope shape is directly recovered when a modulated radio frequency “carrier” is heterodyned by a second (local) unmodulated radio frequency signal of exactly the same frequency as the “carrier”. This process of modulation recovery is technically termed *demodulation* or *detection*. The action is similar to that of a crystal receiver of yesteryear. Coherent detection provides amplification of the recovered modulating signal, termed *conversion gain* if the (local) heterodyning signal is made stronger than incoming modulated “carrier”. Coherent detection will convert signals within a small frequency range on either side of the second (local) unmodulated radio frequency signal termed its band-pass or lock-in range. In the case of a living (human) system its metabolic processes provide the energy to the amplified signal. The low frequency changes in the strength of the microwave signal (cell-phone pulse train) are extracted by the extreme sensitivity of this living coherent detector providing they lie within its “band-pass” and are amplified by the inherent conversion gain to levels sufficient to swamp the CNS and drive it into non-linearity. These signals extend from below 1Hz to at least 4Khz and thus span both the EEG and MEG regions. The whole process is believed to take place at the cell level, internally or in the intercellular spaces that provide the frequency selective properties described above. See also: Biological coherence and response to external stimuli, Frohlich H, 1988.

²⁹ Central Nervous System.

Of serious concern is the misdiagnosis in Ireland, of moderate to severe EHS as mental illness. A typical layperson presenting to her GP with EHS symptoms will be most likely diagnosed with schizophrenia and paranoia because some of her symptoms provide a close match with those present in these psychotic illnesses. Thus a typical GP who knows nothing of EHS and its symptoms will misdiagnose an EHS patient as being mentally ill. And there is anecdotal evidence that up to 50% of the mild to severe cases of EHS have been misdiagnosed as mentally ill in this way.

A further effect of exposure to ELF³⁰ EMR and especially to the ESB house current is suppression of the immune system. This effect appears to be enhanced in children and manifests as childhood leukemia. There is a very strong correlation between rural farm electrification and the increased incidence of this disease in both the US and UK over the last 70+ years.

The measurement of local EMR field strength in and around the homes of EHS sufferers as currently practiced appears to be questionable and the reports of the results as posted on Comreg's website to be deficient and certainly not ISO17020 compliant. It is also questionable if a license granting agent is the best source to oversee health protection and reduction of EMR pollution. I believe these should either be vested in a new non-ionizing radiation branch of the NRPI (National Radiological Protection Institute) or in a new entity located within the EPA (Environmental Protection Agency).

Current thinking on the safety of public exposure needs to be replaced by the views that passive exposure to EMR means exposure to an extremely toxic pollutant which can cause debilitating ill health and that an EHS sufferer is a victim of such unsolicited exposure. Furthermore, the service operator being the polluter, he should be obliged to pay the cost involved for the EHS victim to take whatever remedial action the person needs. That would include the cost of providing screening for the EHS victim to help alleviate painful bioeffects.

As well as the need of a measuring service independent of the Department of Communications, Marine and Natural Resources or ComReg, there is one for the creation of an EHS testing service. This service would allow those presenting with EHS symptoms to be tested so that the frequencies and power levels triggering their symptoms could be determined. The information gained would be essential for determining the measures required to alleviate their EHS condition.

Dr Jean Monro of Breakspear Medical Group, Herts, UK in collaboration with Dr. Cyril W. Smith, Professor Emeritus, Salford University provided a similar service for EHS patients in England.

³⁰ **Extreme Low Frequency, Those frequencies below 30Khz or waves longer than 10,000 meters and include the house current frequency of 50Hz and the whole of the EEG and ECG ranges as well as the natural background radiation around 10Hz.**

Problems specifically associated with the GSM cellphones

The following are some problems specifically associated with the GSM cellphone system in Ireland. Apart from the inappropriate co-location of cellphone aeriels and aerial masts which expose homes, schools, hospitals and other places where children and vulnerable members of the public frequent to noxious microwave radiation, a major concern should be for the way the cell-phone base stations interconnect into the telephone system by “microwave links”. A quick look at ComReg’s web site reveals that frequencies scattered through out the microwave spectrum from 1.3Ghz to 58Ghz are in use for such links³¹. This is a very very bad idea as the literature is filled not only with hazardous bio-effects from modulation on such frequency carriers but also with equally hazardous effects attributed to such carriers even in unmodulated (so called CW) state. Rather than microwave links buried copper or fiber cables should be used for such access links as millimeter-wave EMR (above 30Ghz) is known to be even more disruptive than centimeter-wave EMR.

Problems specifically associated with the ESB distribution

Another major threat to health that has been shown to cause childhood leukemia is the presence of fields from the nominal 50Hz public mains supply. In Ireland, 4 wires are strung along the streets of many hamlets, villages and small towns at bedroom height. In consequence, large parts of the rural and small town population are being exposed during sleep to these noxious fields. Examination of the waveform shows that the supply is anything but the “pure 50hz” that has been used in experimental investigations of the effects of such fields. Rather the public supply in Ireland has a very large third harmonic component at 150hz as well as many “fast transients” due to various electronic equipment such as computer switch-mode PSUs. These fast transients represent wide band signals with components throughout the ELF range. The reality then is that sleepers are being exposed to a pea soup of low frequencies extending across the whole range of EEG and ECG active frequencies, frequencies to which exposure is known to be detrimental to human health.

Border Area Hazards

The British and US Military are widely known to have been using for at least the last 40 years EMR throughout the whole spectrum, from ELF to EHF, to irradiate those they consider “hostile”. The classical case of the continuous long term (5 years plus), irradiation of the GCWPC³² occurred in the 1980’s with sub-thermal microwave radiation. The literature of reported adverse health effects is quite extensive. It is my belief that the GCWPC was used as a live testbed for the development of what are now termed Directed Energy Weapons by the British and their U.S allies. We know that the US DARPA is currently (2005) spending in excess of \$ 1 Billion per year on the development of such techniques and have deployed some such devices in Iraq. Similar problems of adverse health effects exist for people living near the Border. This problem is so well known that the inhabitants of South Armagh have put up many signs (consisting of a skull and crossbones) to indicate locations of RF Hazard caused by the British Military beams.

³¹ The full list is 1.3, 1.4, 2.0, 8, 13, 15, 18, 23, 26, 28, 38 and 56Ghz.

³² Greenham Common Women’s Peace Camp.

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