

Comments-on-Frequencies-used-in-Telecommunications

Comments on the book:

'Frequencies used in Telecommunications. An Integrated Radiobiological Assessment',

by Professor Yuri G. Grigoriev (PhD, DMedSci) 1925-2021, translated and adapted by the Oceania Radiofrequency Scientific Advisory Association (ORSAA) (ref. 1)

For most recent information see the end of this comment

More than two months ago I referred to this translation on my website (ref. 2) and included a summary (made by EMR Australia). The book gives a nice survey of the Russian work on biological effects caused by the electromagnetic fields (EMF) used in wireless communication, with the emphasis on early work (last century) and on mm waves (the higher 5G frequencies).

The adaptations made by ORSAA are not so appropriate, however, they changed the title in such a way that it no longer represents the contents of the book and added a 'Foreword by ORSAA' in which they promote pseudoscientific work.

I did not include my comments in ref. 2 but did send these to ORSAA, to give them the opportunity to correct the translation. This led to a correspondence but so far not to any corrections in the pdf.

I have now waited long enough, so to prevent further spreading of this pseudoscientific information I give my comments in this communication. My comments pertain only to the adaptations made by ORSAA and not to the original text of the book.

My first comment is about the main part of the title of the book:

'Frequencies used in Telecommunications'.

With this title one might expect to find a list of frequencies ranging from, for example, below 1 kHz (military communication with submarines) to above 100 GHz. However, no list of frequencies can be found in the book. The word frequencies is furthermore not used in any of the titles of the many chapters in the book and it is not in the literal translation of the original Russian title. It is not a word used by Grigoriev.

ORSAA changed the title in such a way that it is no longer representative for the contents of the book, which are mainly about the biological effects caused by

the EMF of wireless communication and not about frequencies. So why did ORSAA changed the title in this way?

The most probable answer is found in the 'Foreword by ORSAA' added to the book. In that foreword there is the following alinea:

*'These bio-resonance findings provide principles of immense significance for better understanding of the immune system and human sensitivity to EMFs. Such principles are now being developed in Western medicine and safety science; e.g., Geesink and Meijer (2020) have used bio-resonance and quantum coherence in order to provide a framework for explaining why experimentally observed effects are dependent on **frequency bands** and power density. A better understanding of bio-resonance could assist microwave technology to move out from the currently unhealthy situation and into safer, more bio-compatible systems. Exploration of bio-resonance effects may also open up new methods for healing, thereby creating a qualitative shift in medical science.'*

In this foreword, reference is made only once to the list of references at the end of the book and that is to the paper by Geesink and Meijer. ORSAA thus puts that paper in the spotlight as apparently being of special importance. Frequencies play a most important role in that paper and that probably explains the new title of the pdf of the book, with frequencies as first word. In reality, however, there is nothing special about frequencies. I will explain.

According to Geesink and Meijer (ref. 3) there are many different frequencies: electromagnetic frequencies, EMF frequencies, composed frequencies, EM frequencies, GM frequencies, coherent, decoherent and transient frequencies and some more.

In reality there are only frequencies, without anything added.

As you can read in ref. 4 as well as in many other books and scientific publications, frequency stands for a well known physical quantity which consists of a numerical value and a unit. Numerical values (like frequencies) are just numerical values and nothing else. They cannot be electromagnetic, coherent, decoherent and so on and the same holds for units, these are just units and nothing else. In the field we are concerned with the numerical value can be, in the low-frequency region for example, 50 or 60 with the unit Hz (seconds to the power -1). 50 is just 50 and there is no coherent 50 or decoherent 50. In the radio-frequency region the numerical values are often between 0.7 and 2.6 when GHz is used as the unit. This means that

electromagnetic, coherent, decoherent, transient (and so on) frequencies don't exist.

- Similarly, in ref. 3 I read, and I quote: "decoherent or modulated coherent frequency bands" and "distributed coherent energies" and "quantum coherence equation". It happens to be so that frequency bands are frequency bands and nothing else, energies are energies and nothing else and equations are equations and nothing else.

- In Figs. 3, 5, 11 – 13 of ref. 3 Geesink and Meijer suggest that on a frequency scale there exists a regular alternate ordering of coherent, decoherent and transient frequencies and bandwidths, which alternately would be health sustaining (coherent) or detrimental for health (decoherent). Their model, which would support this all, is according to them "supported by two meta-analysis of about 750 articles of biological electromagnetic experiments". These meta-analysis are their own earlier work. A few times I have been in contact with the authors, insofar as possible (they are fellow countrymen of me), and asked them to send me links to about 8 of the 750 articles which most clearly show this regular ordering. I did get an answer but without any links, not surprisingly, it is not so easy to send information on a regular ordering that does not exist.

So the question is: what's the real situation. In principle it is quite simple. Wireless communication makes use of antennas to send and receive information. This information is sent in the form of electromagnetic fields (EMF) which propagate with the speed of light. In the far field, beyond about one to two wavelengths from the sending antennas, this EMF is also electromagnetic radiation (EMR) consisting of mutually coherent photons.

In ref. 5, for example, you can read:

"An antenna is a coherent emitter of photons, like a laser, so the radio photons are all in phase".

This coherence applies to the one-to-one communication between sender and receiver.

In real life there are often many of these wireless communications each with their own coherent EMF. The different EMF from the different communications are not mutually coherent, they should be as decoherent as possible, so as not to interfere and disturb each other.

There is much more to tell, for example about the analog and digital modulation of the EMF communication signals, but this is beyond the scope of my comments as it is beyond ref. 3.

For more information on the difference between EMF and EMR in general and on the difference between man-made and natural EMF/EMR in particular, see the tutorial (ref. 6) I wrote a few years ago .

To come back to the Geesink-Meijer paper, their suggested sequence of alternate healthy (coherent) and unhealthy (decoherent) frequencies and frequency bands, with transient frequencies in between is pure fantasy, it does not exist and everything derived from it is incorrect. This pure fantasy is the main part of their paper in which they recommend special frequencies to be used for wireless communication.

Instead, the choice of frequencies (frequency bands) for wireless communication is determined by the application (long-distance-lower-frequency-less-information-density, short-range-higher-frequency-higher-information-density) and by the availability of frequency bands.

More than two months ago I suggested ORSAA to remove the references to the pseudoscientific work of Geesink-Meijer from the book and to change the title. This has not yet been done yet. I hope this communication, which I will send around, will be more effective.

It happened before that non-physicists, scientists in other fields, made a not too successful excursion into physics, and that I wrote a comment. For those who are interested and don't want to make similar errors, some examples.

It has been claimed that polarization makes the key difference between man-made and natural electromagnetic fields/radiation, in regard to biological activity. This claim was reproduced in some other papers. If this would be true, it would be very dangerous to wear polarized sun glasses. Fortunately, there are three to four key differences, and not one, as explained in ref. 6, wherein you can find the link to the original claim.

It has been claimed that the electrical forces on the voltage-gated calcium channel (VGCC) voltage sensors in our cell membranes, caused by the EMF of wireless communication, are extraordinarily high and that these would therefore be the main target and mechanism for all biological health effects caused by these EMF. In reality these forces are at least more than three orders

of magnitude smaller than the forces over the cell membranes caused by the natural EMF (in our body), see ref. 7.

From ref. 8 I quote

'It has been widely claimed that radiofrequency electromagnetic radiation, being non-ionising radiation, does not possess enough photon energy to cause DNA damage. This has now been proven wrong experimentally.'

In other respects, ref. 8 gives an excellent review, but this conclusion is entirely wrong. My comment (ref. 9):

'The widely claimed statement that the photons don't possess enough energy to cause DNA damage is of course fully correct.

However this is not the point at all. DNA damage is not caused by interaction with individual photons but by interaction with the EMF build up by the billions times billions of photons with the same frequency, the same polarization and the same phase.'

For a further explanation I refer to the present ref. 6.

For a tutorial (Zoom interview) with more physics in this field see ref. 10.

To conclude with some final remarks, in describing the interaction between the man-made electromagnetic fields (EMF) used in wireless communication with humans, animals and plants there is no reason to make any errors in the physics part. That is based on Maxwell's equations which were known already before the year 1900. The digital modulation is more recent but is also always clearly defined. Fancy words such as coherence, decoherence and quantum entanglement come from quantum mechanics which was developed long after Maxwell's theory was widely accepted. Using these words in describing the EMF used in the wireless communication is either incorrect or the same as adding noise. In describing the interaction of these EMF with biological material there are, on the other hand, certainly coherent (or collective) interactions.

References

1. Frequencies used in Telecommunications. An Integrated Radiobiological Assessment

https://www.orsaa.org/uploads/6/7/7/9/67791943/frequencies_used_in_telecommunications_an_integrated_radiobiological_assessment.pdf (replaced by)
https://www.orsaa.org/uploads/6/7/7/9/67791943/frequencies_used_in_telecommunications_final_draft_version.pdf

2. Frequencies used in Telecommunications. An Integrated Radiobiological Assessment

<https://www.stopumts.nl/doc.php/Artikelen/12832/redirect>

3. A predictive model that reveals a causal relation between exposures to non-thermal electromagnetic waves and biological effects (update January 2021)

<https://www.researchgate.net/publication/348265605>

4. SI derived unit

https://en.wikipedia.org/wiki/SI_derived_unit

5. Radio wave

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6. On the difference between Man-made and Natural Electromagnetic Fields/Radiation, in regard to Biological Activity

<https://www.stopumts.nl/pdf/Man-made-and-Natural-EMF-EMR.pdf>

7. VGCC the main mechanism for all EMF effects? Comment on and additions to Pall's claim

<https://www.stopumts.nl/doc.php/Artikelen/12098/redirect>

8. Planetary electromagnetic pollution: it is time to assess its impact

[https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(18\)30221-3/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(18)30221-3/fulltext)

9. Planetary electromagnetic pollution: it is time to assess its impact

<https://www.stopumts.nl/doc.php/Artikelen/11772/redirect>

10. <https://ehtrust.org/insights-on-wireless-radiation-from-a-physicist/>

<https://emraustralia.com.au/blogs/news-1/insights-on-wireless-radiation-from-a-physicist>

<https://www.stopumts.nl/pdf/Electromagnetic-Fields-Radiation-and-Health-Interview.pdf>

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The pdf of this comment:

www.stopumts.nl/pdf/Comments-on-Frequencies-used-in-Telecommunications.pdf

Added June 30:

For comments from my side on earlier pseudoscientific work by Geesink and Meijer and on a similar pseudoscientific contribution in this field by other authors see:

www.stopumts.nl/doc.php/Artikelen/12680/zin_en_onzin_in_%E2%80%98straling_van_alles_kanten_bekeken%E2%80%99

I am sorry this is in Dutch, but with Google translate one can come quite far in understanding.

Added July 4:

The present situation is that ORSAA changed only the name of the link to their paper (Ref. 1). They still promote the fake science (fake physics) by the two non-physicists Geesink and Meijer and ignore the comments I gave above and ignore my suggestion to change the title and to remove the links to the Geesink/Meijers pseudoscience.