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# microwave hearing (**Frey effect**), especially voice modulation

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There is a great deal more information on microwave hearing (the **Frey effect**) on the web now than there was even just a couple of years ago. At the bottom of this article I have included a list of some of the quality material now available. I have focused on the voice-modulation aspect, whereby an audio signal can be modulated onto the microwave carrier and subsequently perceived as the original sound "in the head" of a person illuminated with the microwave radiation.

Nonetheless, full answers to questions such as the following -- as far as I know -- are not known in the open literature:

-- Do \*individuals\* vary widely in their sensitivity to the **effect**?  
What power levels affect the most sensitive people?

-- How do different variables affect an individual's sensitivity to the **effect**? Are there ways it can be increased? Would initial harassment and resulting PTSD have any **effect** on it? Chemicals? Electromagnetic exposure? Age? Etc.

-- How do microwave parameters (such as pulse rate) for peak **effect** vary for different people? (Some mathematical models vary according to head size, as one variable.)

-- What is the subliminal threshold for any **effect**? Is it below the conscious hearing level?

-- Are there other low-power effects which can cause subjectively similar results (such as "voices") in humans?

These sorts of questions are important just for their potential relevance to the health of people in an environment full of electropollution.

It would not be that difficult to construct a test of the **effect** that people could take like a hearing test. It would just require some market for the machine (homemade devices may be dangerous) and a medical recognition of the **effect**.

If such devices and practitioners were available, then people reporting related symptoms could be tested, if only to find out the relevant data. They could also get an idea of what such voices sound like and "seem like" subjectively and compare them to what they experience.

The effects mind control victims report might be related to the **Frey effect** or might not. Specifically, among true victims, some may be

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assaulted with microwave-hearing-based weapons but others are assaulted with different technology or techniques.

Effects such as microwave hearing might be used at a later stage to actually dismiss victims, by people claiming it was all electrical sensitivity or it was \*all\* harassment with microwave-hearing-based devices. But what is new? Mind control victims know it is always something with the torturers, always some distraction or rationalization, anything but that they are victims of domestic torture operations. Don't forget the known and documented mind control victims who are still ignored and ridiculed, and secret research projects like PANDORA set up specifically to test microwave effects on human behavior. How many domestic torture victims further persecuted as "schizophrenics" by supposed healers are too many? The Soviets had a term, "sluggish schizophrenia," for people crazy enough to challenge the totalitarian state.

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----- References on the web, with excerpts. -----  
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[Frey's original 1962 paper.]  
<http://www.raven1.net/frey.htm>

[An SBIR contract on "Communicating Via the Microwave Auditory **Effect**"]  
[Http://www.raven1.net/v2s-kohn.htm](http://www.raven1.net/v2s-kohn.htm)

An innovative and revolutionary technology is described that offers a means of low-probability-of-intercept Radio frequency (RF) communications. The feasibility of the concept has been established using both a low intensity laboratory system and a high power RF transmitter. Numerous military applications exist in areas of search and rescue, security and special operations.

[A recent paper by Lin, with references esp. to pitch of perceived signal.]  
[http://www.eecs.uic.edu/eecspeople/lin\\_acm3.htm](http://www.eecs.uic.edu/eecspeople/lin_acm3.htm)

[Abstract of a NASA technical report, very direct about the applications.]  
<http://www.abovetopsecret.com/pages/lowpower.html>

A decoy and deception concept presently being considered is to remotely create the perception of noise in the heads of personnel by exposing them to low power, pulsed microwaves. When people are illuminated with properly modulated low power microwaves the sensation is reported as a buzzing, clicking, or hissing which seems to originate (regardless of the person's position in the field) within or just behind the head. The phenomena occurs at average power densities as low as microwatts per square centimeter with carrier frequencies from 0.4 to 3.0 GHz. By proper choice of pulse characteristics, intelligible speech may be created. Before this technique may be extended and used for military applications, an understanding of the basic principles must be developed. Such an understanding is not only required to optimize the use of the concept for camouflage, decoy and deception operations but is required to properly assess safety factors of such microwave exposure.

Major Subject Terms: AUDITORY PERCEPTION - BRAIN CIRCULATION - DECEPTION - MICROWAVES - PHYSIOLOGICAL EFFECTS - RADIATION EFFECTS

Minor Subject Terms: BIOLOGICAL EFFECTS - HEMODYNAMICS - MILITARY TECHNOLOGY - RADIATION DOSAGE - SOUND LOCALIZATION

[An email from Alan **Frey**, a long-time researcher in microwave hearing.]  
<http://iubio.bio.indiana.edu/R13391-15315-/news/bionet/emf-bio/9603.newsm>

There is a microwave hearing **effect** that occurs at very low power densities and a skull vibration **effect** that occurs when very high energies are applied to the head. There is some confusion in the literature because the

vibration **effect** has often been referred to as a microwave hearing **effect**, but it is not the same phenomena.

[A Navy publication reprinted at John Pike's web site. He was formerly with FAS.]  
<http://www.globalsecurity.org/org/news/2001/e20010327questions.htm>

Inside The Navy  
March 26, 2001  
Vol. 14, No. 12  
Pg. 1  
(Reprinted with permission)

Questions Linger About Health Effects Of DOD's 'Non-Lethal' Ray

by Christopher J. Castelli, Chief Editor

[...]

Though U.S. military proponents of the non-lethal ray say they worry the public will get the wrong idea about the technology, the Air Force's own "New World Vistas" report, published in the mid 1990s, actually describes goals of using electromagnetic radiation for what sounds like mind control.

"It would also appear possible to create high fidelity speech in the human body, raising the possibility of covert suggestion and psychological direction. When a high power microwave pulse in the gigahertz range strikes the human body, a very small temperature perturbation occurs. This is associated with a sudden expansion of the slightly heated tissue," states the report. "This expansion is fast enough to produce an acoustic wave. If a pulse stream is used, it should be possible to create an internal acoustic field in the 5-15 kilohertz range, which is audible. Thus it may be possible to 'talk' to selected adversaries in a fashion that would be most disturbing to them." This appears to be a reference to the "microwave hearing **effect**," a scientific phenomena **Frey** is credited with discovering in the 1960s.

Hackett said the non-lethal MMW ray project is not seeking to create that kind of talking **effect** in people's heads.

In fact, **Frey** and Hackett said the microwave hearing **effect** does not occur with millimeter waves (which range from 3 to 300 GHz).

"On the other hand, if your millimeter waves have enough energy density, are powerful enough, there are other phenomena where you could cause sort of a concussion kind of **effect** which could conceivably be heard by bone conduction. It would transfer through skin to bone and bone into the inner ear," **Frey** said. He said it might be possible to modulate such energy to create the perception of some intelligible sounds. "But off hand, I can't tell you what kind of power levels you might need to do that," he said. Hackett dismissed the idea of transmitting intelligible sounds to the head with MMWs as pure speculation.

[...]

[An OSHA slide presentation on general microwave health effects.]

<http://www.osha-slc.gov/SLTC/radiofrequencyradiation/rfpresentation/healtheffects/mainpage1.html>

[Excerpts from a book(?) on biological effects of non-ionizing radiation.]

<http://www.reach.net/~scherer/p/biofx.htm>

Selected excerpts to  
Biological Effects of Radiofrequency Radiation (revised 2 February 1996 )  
cut/condensed from Biological Effects of Radiofrequency and Microwave  
Radiation: Application, Hazards, and Safeguards. by Wolfgang  
W. Scherer ( 25. March 1994 )

..... A special role is played by  
the electrophonic **effect** of microwave hearing. Humans can perceive a  
buzzing or clicking sound in the back of their heads at exposure to

microwave hearing (Frey effect), especially voice modulation

power densities as low as 0.1 mW/cm<sup>2</sup> of pulsed microwave radiation (200-3000 MHz) , depending on the pulse repetition frequency and the peak power density (around 300 mW/cm<sup>2</sup>). The absorbed energy produces a thermoelastic expansion of the brain tissue causing an acoustic pressure wave which is detected in the cochlea by the hair cells of the organ of Corti. The energy needed to produce this **effect** is so small that it does not actually increase the mean temperature of the brain, yet the acoustic sensation is strong enough to be clearly perceived in an ambient noise level of circa 65 dB. Due to this fact microwave hearing does not cause an apparent physical reaction within the head, but it is well known that humans suffer general stress reactions when they are exposed to higher levels of sound. Noise cannot only be an annoyance, but when it consists of pulsed sounds it affects heart beat and metabolic rates. [8] The subliminal aspects of noise levels are here not even considered despite the recognized physiological effects of acoustic noise. It would be a very interesting field for research to probe the subliminal acoustic effects of such exposure to low radio frequency radiation. A possible link between such radiation and noise related reactions , effects, or damages would be an aspect worth of further investigation.....

["Radio Frequency Radiation (RFR) Bio-Effects Research in the Pan-Pacific Area"]  
<http://www.nmjc.org/aoard/HERFR.html>

Relatively high-intensity RF fields have been shown to cause adverse health consequences by heating tissues. No adverse health effects have been scientifically confirmed from exposure to low-level RF fields for extended periods, but certain questions have not been thoroughly studied. There is very little information available in the scientific literature to assess any health risks from exposure to pulsed RF fields. Studies are needed that seek to identify any biological effects produced by pulsed RF fields, of both high and low peak pulse intensities. Examples of current and future technologies using pulsed RF fields are telecommunications, civilian and military radar systems, including emerging radar technology such as ultra-wide band radars and anti-electronic weapons. Current and future research applicable to mobile telephone systems should focus on the 900-2000 MHz frequency range and appropriate pulsing and modulation patterns.

[Justensen's article online, first published mention of speech-modulated microwave.]  
<http://www.adacomp.net/~mcherney/justesen.htm>

By radiating themselves with these "voice modulated" microwaves, Sharp and Grove were readily able to hear, identify, and distinguish among the 9 words. The sounds heard were not unlike those emitted by persons with artificial larynxes. Communication of more complex words and of sentences was not attempted because the averaged densities of energy required to transmit longer messages would approach the current 10 mW/cm<sup>2</sup> limit of safe exposure.

[Also search at the U.S. Patent Office]  
<http://www.uspto.gov/patft/index.html>

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Mind Control: TT&P ==> <http://www.datafilter.com/mc>  
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