

**AN OVERVIEW
OF UNITED STATES ACTIVITIES
FOR NONIONIZING ELECTROMAGNETIC
RADIATION SAFETY**

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OUTLINE

Program Goal

Strategy

Organizational Roles

THREE FACTS

Because NER is so enormously useful

- 1. Growth in number of sources**
- 2. Growth in number of people exposed**

However

- 3. Intense electromagnetic fields are hazardous.**

IMPLICATION

It is necessary to prevent exposure to hazardous levels of NER without inhibiting its beneficial applications.

THREE QUESTIONS

- 1. What exposure levels are hazardous?**
- 2. Where and how often are they encountered?**
- 3. How can we prevent human exposure to such fields with minimum disruption of the services they provide?**

NONIONIZING ELECTROMAGNETIC RADIATION SAFETY

A Program of Coordinated Federal
Activities Related to Biological
Effects of Nonionizing Electro-
magnetic Radiation (0-300GHz)

Available from:
Office of Public Information
National Telecommunications and
Information Administration
1800 G Street, N.W., Wash., D.C. 20504



special publications

Elements of the PROGRAM ON BIOLOGICAL EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION (BENER)

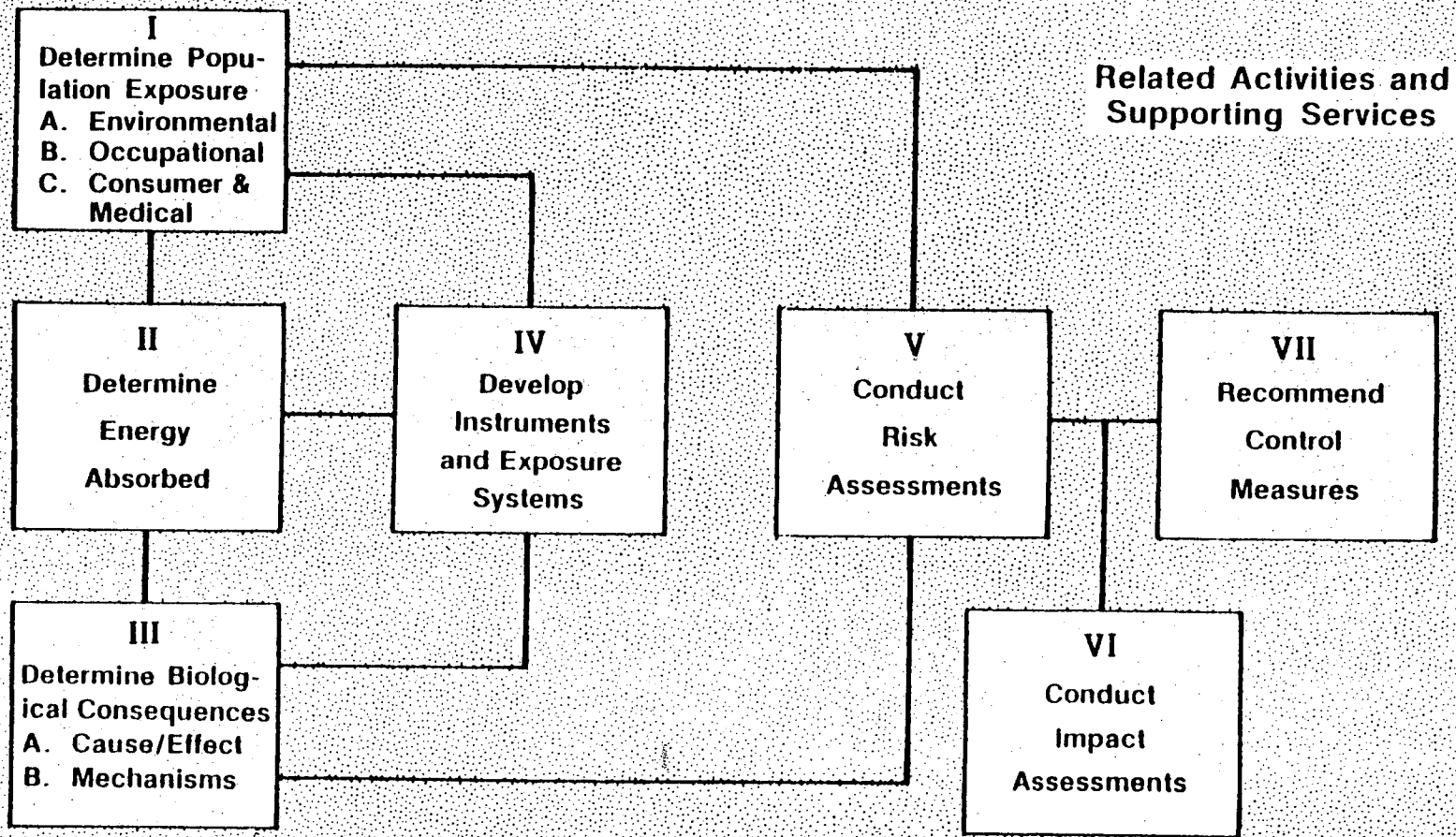


FIGURE I

DETERMINE POPULATION EXPOSURE

- A. Environmental — EPA**
- B. Occupational — OSHA with BRH and NIOSH**
- C. Consumer & Medical — BRH**

DOSIMETRY

DOD — Army, Navy, and Air Force + Contractors
BRH
NSF

BIOLOGICAL CONSEQUENCES

Navy

Air Force

Army

EPA

BRH

NIOSH

NIEHS

VA

INSTRUMENTATION AND EXPOSURE SYSTEMS

Actual Instrument Development

**NBS
BRH**

Other Funding Sources

**DOD
NIOSH
EPA**



**Agencies with
measurement
problems**

.....
NSF

Program Grants

RISK ASSESSMENT

Navy

NIOSH

BRH

IMPACT ASSESSMENT

FCC

RECOMMEND CONTROL MEASURES

- BRH** controls electronic Product Emissions e.g. microwave ovens and medical diathermy equipment.
- OSHA** has responsibility for assuring a safe and healthful work place.
- NIOSH** makes recommendations to OSHA. Working on Criteria Document for RF and Microwave Exposure.
- EPA** has authority to establish environmental standards and to issue guidance to Federal Agencies and planning.
- DOD** establishes mandatory control measures covering its own operations.
- FCC** controls the private use of the EM spectrum.
- NTIA** controls the government's use of the EM spectrum.

MANDATORY LIMITS FOR GENERAL POPULATION EXPOSURE

- **Federal** — none at present
— EPA to issue Notice of Proposed Rulemaking in Feb. 1981
- **State** — Texas at $10 \frac{\text{mW}}{\text{cm}^2}$
- **Municipal** — Portland, Oregon at $100 \frac{\text{mW}}{\text{cm}^2}$

MANDATORY LIMITS FOR OCCUPATIONAL EXPOSURE

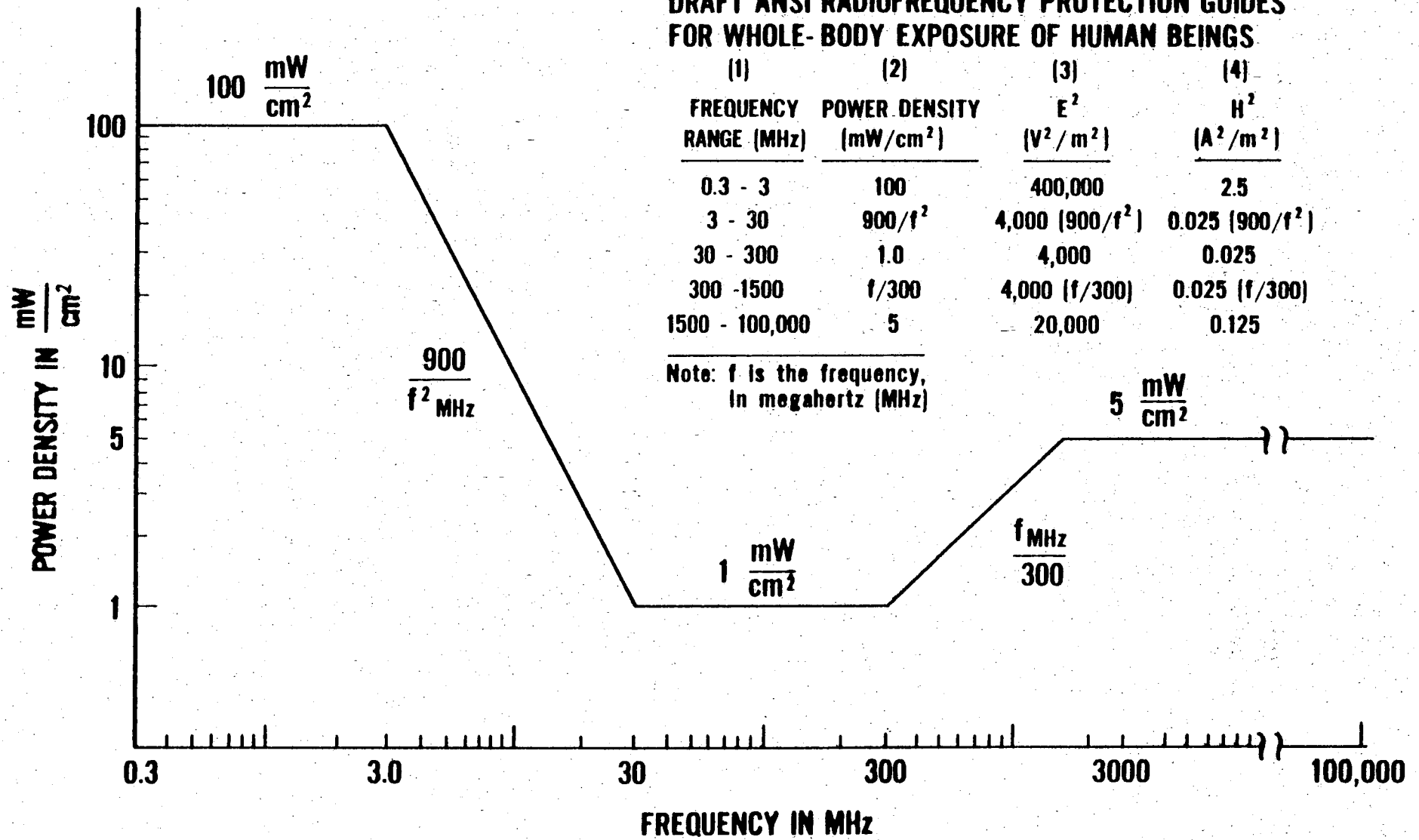
Federal — OSHA @ $10 \frac{\text{mW}}{\text{cm}^2}$

State — Vermont @ $10 \frac{\text{mW}}{\text{cm}^2}$

MANDATORY PRODUCT EMISSION STANDARDS

- Federal** — **BRH/Microwave Ovens**
- 1 $\frac{\text{mW}}{\text{cm}^2}$ before sale**
 - 5 $\frac{\text{mW}}{\text{cm}^2}$ after sale**
- **BRH/Proposed Medical Diathermy Standard**
- 10 $\frac{\text{mW}}{\text{cm}^2}$ at 5 cm from applicator**
- State** — **Alaska, Oregon, Rhode Island and Texas cover microwave ovens and (for OR and TX) their servicing**
- Municipal** — **New York City regulations cover microwave ovens and servicing.**

DRAFT ANSI RADIOFREQUENCY PROTECTION GUIDES FOR WHOLE-BODY EXPOSURE OF HUMAN BEINGS



RELATED ACTIVITIES AND SUPPORTING SERVICES

NTIA Coordination
IRAC FMAC US/USSR Exchanges ACGIH
TEPRSSC CRCPD CRS ANSI R.P.C.
NIOSH CRITERIA DOCUMENT IMPI URSI COMAR
NCRP IEEE-MTTS EIA ISA CIA TRISERVICE PROGRAM
IEC GAD ERMAC IRLG BEMS
Congressional Committees
IRPA CBEMA SAE OSTP

RELATED ACTIVITIES AND SUPPORTING SERVICES

- **Federal agencies**
- **Congress**
- **Professional organizations**
- **Standards writing groups**
- **Other organizations**

COORDINATION ACTIVITIES AMONG THE FEDERAL AGENCIES

- **TERP** — **Triservice Electromagnetic Research Panel. Coordinates radiation research activities of the Army, Navy, and Air Force.**
- **IRLG** — **Interagency Regulatory Liaison Group. Coordinates the research and regulatory activities of its members (BRH, EPA, OSHA, NIOSH, FCC).**
- **NIEHS** — **Coordinates joint US/USSR research on microwave, static and low frequency effects.**
- **NTIA** — **Coordinates bioeffects research of all relevant agencies.**
- **OSTP** — **Provides scientific advice to the President and to OMB.**
- **RPC** — **Coordinates the formulation and implementation of Federal policies relating to radiation protection.**

FEDERAL AGENCY ADVISORY BODIES

- **ERMAC = Electromagnetic Radiation Management Advisory Council**
- **IRAC = Interdepartmental Radio Advisory Committee**
- **FMAC = Frequency Management Advisory Council**
- **TEPRSSC = Technical Electronic Product Radiation Safety Standards Committee**

Advises NTIA on side effects of telecommunication activities.

Representatives of Federal Agencies who assist NTIA in managing the Government's uses of the RF spectrum. Oldest interdepartmental committee.

Committee of industry representatives who review recommendations of IRAC and advise NTIA on Federal Government's frequency management activities.

Advises BRH on the establishment of radiation safety performance standards for electronic products.

CONGRESSIONAL ACTIVITIES AND SERVICES

- **Senate Committee on Commerce Science and Transportation**
 - **Hearings on Radiation Health and Safety in June 1977.**
 - **Report on Radiation Health and Safety in Dec. 1978.**
 - **Report on Microwave Irradiation of the U.S. Embassy in Moscow in April 1979.**
- **Representative Elizabeth Holtzman introduced a bill to protect workers from nonionizing radiation in March 1979.**
- **House Subcommittee on Labor Standards conducted hearings on ionizing and nonionizing radiation in May 1979.**
- **House Subcommittee on the Environment and Natural Resources conducted hearings on Research on Health Effects of Nonionizing Radiation in July 1979.**

CONGRESSIONAL ACTIVITIES AND SERVICES (Cont.)

- **Congressional Research Service maintains an awareness of issues of Congressional interest. Issue Brief #77062 on Radiation Health and Safety is available through your representative.**
- **General Accounting Office Reports**
 - **Efforts by the Environmental Protection Agency to Protect the Public from Environmental Nonionizing Radiation Exposure; CED-78-79; Mar. 29, 1978.**
 - **More Protection from Microwave Radiation Hazards Needed; HRD-79-7; Nov. 30, 1978.**
 - **Radiation Control Programs Provide Limited Protection; HRD-80-25; Dec. 4, 1979.**

PROFESSIONAL ORGANIZATIONS INVOLVED WITH NONIONIZING RADIATION

- **ACGIH = American Conference of Governmental Industrial Hygienists** **Founded in 1938 for the promotion of standards and techniques in industrial health. Established threshold limit values for exposure to specific industrial agents (including nonionizing radiation).**
- **BEMS = Bioelectromagnetics Society** **Founded in 1978 to promote the scientific study of the interaction of electromagnetic and acoustic energy with biological systems.**

PROFESSIONAL ORGANIZATIONS INVOLVED WITH NONIONIZING RADIATION (Cont.)

- **COMAR = Committee on Man and Radiation** **A branch of IEEE founded in 1972 to educate the public and other members of IEEE on the biological influences of RF radiation. Also somewhat political in nature.**
- **CRCPD = Conference of Radiation Control Program Directors** **Founded in 1968 for the exchange of radiation health and safety information between State and Federal agencies. Subcommittee on nonionizing radiation established in 1980.**

PROFESSIONAL ORGANIZATIONS INVOLVED WITH NONIONIZING RADIATION (Cont.)

- **EMC = Electromagnetic Compatibility** **An IEEE society founded in 1957 to deal with the mutual interactions between devices or systems and their electromagnetic environment.**
- **IEEE = Institute of Electrical and Electronic Engineers** **The largest engineering society in the world (about 200,000 members). Was formed in 1963 for the advancement of the theory and practice of electrical engineering, electronics, radio and allied branches....Conducts lobbying activities.**

PROFESSIONAL ORGANIZATIONS INVOLVED WITH NONIONIZING RADIATION (Cont.)

- **IMPI = International Microwave Power Institute** **Founded in 1966 for professionals interested in the advanced scientific applications of microwave energy. Now also involved with domestic or industrial microwave heating as well as chemical and biological effects.**
- **MTT-S = Microwave Theory and Techniques Society** **A branch of IEEE founded around 1953. Concerned with the detailed, technical aspects of microwave theory and applications.**

PROFESSIONAL ORGANIZATIONS INVOLVED WITH NONIONIZING RADIATION (Cont.)

- **URSI = International
Union of Radio
Science**


Traces its history to the establishment in 1913 of a society to encourage international studies of the propagation of radiowaves and of the basic scientific problems associated with radio communication as well as the applications of radio techniques to the acquisition of observational data involving electromagnetic phenomena in other branches of science.

WHY ALL OF THIS ATTENTION TO PROFESSIONAL ORGANIZATIONS?

- **Sources of information and expertise**
 - **journals**
 - **conferences**
 - **seminars**
 - **short courses**
- **Write standards**
 - **what we do**
 - **how we do it**
- **Implement or enforce standards**

STANDARDS DEVELOPMENT GROUPS INVOLVED WITH NONIONIZING RADIATION

ANSI = American National Standards Institute

- **Traces its history to 1918**
- **A federation of**
 - **industrial**
 - **trade**
 - **technical**
 - **labor and**
 - **professional**
 - **government agencies**
 - **consumer groups**

organizations
- **Principal Functions**
 - **coordinate the development of voluntary standards in the private sector**
 - **provide national representation to international standardization organizations**

SOME OTHER STANDARDS DEVELOPMENT GROUPS INVOLVED WITH NONIONIZING RADIATION

National

- **Computer and Business Equipment Manufacturers Association (CBEMA)**
- **Electronic Industries Association (EIA)**
- **Institute of Electrical and Electronic Engineers (IEEE)**
- **Scientific Apparatus Makers Association (SAMA)**
- **Society of Automotive Engineers (SAE)**

International

- **International Electrotechnical Commission (IEC)**
- **International Organization for Legal Metrology (OIML)**
- **International Radio Consultative Committee (CCIR)**
- **International Special Committee on Radio Interference (CISPIR)**
- **International Standards Organization (ISO)**

OTHER ORGANIZATIONS INVOLVED WITH NONIONIZING RADIATION

- **NAS = National Academy of Sciences**
Established by Congress in 1863. An organization of distinguished scientists and engineers who, whenever called upon by any department of the Government, investigate, examine, experiment, and report upon any subject of science or art.... (BEIR, SPS).
- **NCRP = National Council on Radiation Protection and Measurement**
Established in 1929. Constituted in its present form in 1964 by an act of Congress (PL 88-376). Develops information and recommendations on radiation protection and measurements.