National Electromagnetic Monitoring Plan

Independent Assessment of Electromagnetic Exposure in United States Cities

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Reference Proposal for Government Consideration

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Proposed model Federal support for an independent university and community consortium
Initial program period 24 months
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Executive Summary

EFEIA Foundation proposes the establishment of a National Monitoring Plan to systematically characterize environmental electromagnetic exposure in United States cities and investigate potential associations with health and well-being.

Drawing on the NOXTAK project framework and EFEIA Foundation's previous monitoring activities, the Plan would establish an independent network encompassing extremely low-frequency fields (ELF), low-frequency fields (LF), high-frequency fields (HF), and the broader radiofrequency spectrum, including microwave frequencies extending into high-GHz and selected millimeter-wave bands. Intermediate ranges would be explicitly addressed in the technical coverage plan.

The program would assess electric and magnetic fields associated with alternating-current electricity, power lines, substations, transformers, wiring, and electrical equipment, alongside emissions from communications systems, broadcast infrastructure, radar, and other relevant sources.

Residential neighborhoods, childcare facilities, schools, hospitals, and long-term care facilities would receive particular attention. Monitoring would characterize exposure across space, time, frequency, and operating conditions, including averages, peaks, intermittency, and measurable modulation-related microvariations.

The initial program comprises six months of preparation, twelve months of monitoring and evaluation, and six months of integrated data analysis and report preparation. The first national report would be delivered by the end of Month 24.

The requested government action is to fund this initial two-year cycle, support an independent university consortium, and establish transparent methods, quality assurance, and public reporting.

1 Rationale and Institutional Background

Communities need reliable, independently collected information about the electromagnetic environments in which they live, work, study, and receive care. A coordinated program would provide comparable measurements across participating cities, identify locations requiring closer assessment, and strengthen the evidence available to public agencies and researchers.

EFEIA Foundation's environmental monitoring and preliminary symptom-assessment activities provide an organizational starting point. Its public research portfolio includes human-health research, youth exposure education, and electromagnetic risk assessment. [1]

The Plan would draw on the NOXTAK project framework specified by the proposing organization. During preparation, relevant documentation, including measurement parameters, instrument specifications, sampling procedures, and analytical methods, would undergo independent technical review for incorporation into the national protocol.

Previous local investigations, including the Doral environmental work and school symptom documentation, would inform sampling design and research hypotheses. Their findings would be evaluated according to documentation, measurement quality, and study limitations before incorporation into national analyses.

2 Goal and Objectives

The goal is to establish a transparent, scientifically credible national framework for independent electromagnetic exposure monitoring and related public-health research.

- Develop and publish a standardized monitoring protocol.
- Establish baseline exposure profiles across participating cities.
- Characterize frequency-specific, spatial, and temporal exposure patterns.
- Identify priority locations for repeat assessment or technical investigation.
- Assess residential, educational, childcare, healthcare, and occupational settings.
- Build a university consortium for monitoring, quality assurance, and research.
- Investigate potential associations between exposure patterns and health outcomes.
- Deliver the first national report at the end of the two-year program.

3 Electromagnetic Spectrum and Sources Covered

The program would span ELF, LF, HF, and the broader RF spectrum through high-GHz microwave frequencies, with intervening ranges explicitly included. Because HF and microwaves are subdivisions of RF, the protocol would specify numerical frequency ranges rather than rely solely on category names.

Component	Principal focus
Extremely low-frequency fields	Alternating-current power systems, particularly 60 Hz, and relevant nearby frequency components.
Low-frequency fields and intervening ranges	Electrical infrastructure, power electronics, switching systems, induction equipment, and other identified sources.
High-frequency fields	Relevant communications, broadcast, industrial, and other emissions in the HF range.
Broader radiofrequency coverage	Relevant sources across intervening and higher RF bands, including broadcast, mobile communications, and wireless networks.
Microwave and high-GHz coverage	Cellular systems, Wi-Fi, radar, directional links, and other microwave sources, extending into selected millimeter-wave bands.

A frequency-coverage matrix would identify instruments, probes, sensitivity, detection limits, and sampling methods for each range. Coverage gaps would be disclosed. No single meter would be assumed to characterize the full electromagnetic environment.

Low-frequency electric and magnetic fields would be measured separately and reported in V/m and μT, respectively. RF and microwave assessments would use appropriate frequency-selective field-strength and power-density methods. Derived quantities would be reported only when the physical assumptions are valid.

4 Monitoring Locations and Population Priorities

Monitoring would include residential neighborhoods; childcare facilities and schools; hospitals, clinics, and long-term care facilities; workplaces and public spaces; and areas surrounding power lines, substations, transformers, and communications infrastructure.

Site selection would combine representative sampling with targeted assessments of community concerns. Participating cities would reflect differences in population density, infrastructure, geography, and socioeconomic conditions.

Children, older adults, pregnant individuals, people with chronic conditions, and individuals reporting electromagnetic sensitivity would receive appropriate consideration in study design and protections. Prioritization would reflect care and research needs without presuming an established heightened biological susceptibility in every group.

5 Monitoring Architecture

Fixed monitoring stations

Continuous measurements would document daily, weekly, and seasonal patterns throughout the twelve-month evaluation period.

Mobile surveys

Repeatable routes would characterize spatial variation across neighborhoods, infrastructure corridors, and public spaces.

Institutional assessments

Indoor and outdoor measurements would characterize occupied spaces in participating schools, childcare facilities, hospitals, and other institutions, subject to access agreements.

Personal exposure studies

A voluntary research subset would carry suitable monitors and maintain activity records to assess relationships between location-based measurements and individual exposure.

Repeated measurements would use comparable procedures. Changes in instruments, infrastructure, occupancy, and operating conditions would be recorded.

6 Dynamic Exposure and Modulation Microvariations

A central objective is to make dynamic exposure patterns visible and measurable. Routine analysis would include averages, medians, upper percentiles, instrument-defined peaks, event duration, intermittency, spatial gradients, and differences between occupied and unoccupied periods.

Specialized assessments would examine rapid fluctuations, burst timing, duty cycle, envelope variability, and time–frequency characteristics where instrument capability permits. Sampling rate, bandwidth, detector response, capture duration, and uncertainty would be specified.

Routine environmental logging would be distinguished from specialized high-resolution signal capture. Investigators would separate genuine variations from instrument noise, artifacts, and saturation. Detecting a modulation feature would not, by itself, establish its health significance.

7 Standardized Protocol and Quality Assurance

The preparation phase would produce a publicly available National Electromagnetic Exposure Monitoring Protocol, incorporating independently reviewed elements from NOXTAK and EFEIA Foundation's monitoring experience.

The protocol would specify site selection and positioning; numerical frequency coverage; calibration and field checks; sampling intervals and recording duration; spatial and temporal averaging; methods for intermittent and directional sources; data validation and uncertainty; and reproducible reporting procedures.

Universities would conduct instrument comparisons and duplicate assessments. An independent quality-assurance function would audit methods and data. Environmental readings would describe measured conditions at a place and time; their use as estimates of individual exposure would require additional assessment.

8 Critical Exposure Review Framework

The Plan would develop criteria for identifying conditions requiring further investigation, particularly in residential and care settings.

Category	Basis and response
Potential regulatory concern	Measurements suggest a possible exceedance of an applicable requirement. Conduct confirmatory assessment and refer validated concerns to the responsible authority.
Monitoring priority	Persistent or unusual exposure relative to a defined comparison distribution. Repeat monitoring and investigate sources.
Research priority	Exposure characteristics or population circumstances warrant closer study. Undertake enhanced measurement and independently reviewed research.

Applicable United States RF requirements would be identified explicitly, including relevant provisions of 47 CFR § 1.1310. International guidelines would be labeled according to their scientific and legal role. [2, 3]

Any proposed precautionary benchmarks would require a published rationale and independent review. Investigation triggers would be distinguished from established thresholds of harm.

9 Health and Psychophysiological Evaluation

The twelve-month monitoring and evaluation phase would include an independently approved research component examining potential associations between measured exposures and predefined outcomes, including sleep quality, headaches, fatigue, concentration difficulties, functional well-being, and selected psychophysiological measures.

EFEIA Foundation questionnaires could contribute to preliminary symptom collection after review of provenance, scoring, reliability, and suitability. Validated instruments would be incorporated where appropriate. Symptom scores, environmental measurements, and clinical diagnoses would remain distinct.

Repeated observations would support evaluation of temporal relationships. Analyses would address noise, air pollution, lighting, temperature, housing, socioeconomic conditions, screen use, sleep schedules, existing illnesses, medications, stress, and exposure expectations.

Analyses would be preregistered, with power calculations, suitable comparison groups, and adjustment for multiple testing. Positive, negative, and inconclusive findings would be reported. The first report would distinguish descriptive findings and exploratory associations from conclusions requiring longer follow-up.

A twelve-month evaluation would not generally establish long-term disease incidence or causation. WHO distinguishes biological responses from adverse health effects, an essential consideration in interpretation. [4] Human-participant research would require ethics review, informed consent, and appropriate protections for minors.

10 University Consortium and Governance

An open invitation would recruit universities and qualified institutions for protocol development, monitoring, training, analysis, and independent review. The consortium would include electromagnetic measurement, electrical engineering, environmental health, epidemiology, pediatrics, biostatistics, and research ethics expertise.

Governance would comprise a scientific steering committee, technical measurement group, health-research group, community advisory panel, and external quality-assurance function. EFEIA Foundation would contribute field experience, community relationships, preliminary tools, and NOXTAK reference materials under the same review requirements as other participants.

Funding sources and relevant conflicts of interest would be public. Agreements would protect publication and prevent funders or participating organizations from suppressing findings.

11 Two-Year Implementation Schedule

Phase	Period	Activities and deliverables
Preparation	Months 1–6	Establish governance; recruit universities and cities; review NOXTAK and EFEIA materials; finalize designs; obtain ethics approvals and access agreements; procure and calibrate equipment; train teams; publish the protocol.
Monitoring and evaluation	Months 7–18	Conduct twelve months of environmental monitoring, repeated institutional assessments, and approved participant evaluations; capture seasonal variation; perform ongoing quality checks.
Data analysis and first report	Months 19–24	Finalize data validation; conduct integrated exposure and health analyses; complete independent review; prepare city profiles, national synthesis, and recommendations; publish the first report.

The first national report would be delivered by the end of Month 24. Its national scope would describe the participating network; claims of national representativeness would depend on the final sampling design and achieved coverage. Urgent validated findings would be communicated through predefined procedures during implementation.

12 Funding and Resources

Funding is requested for the complete initial two-year cycle. The budget would cover personnel, university coordination, instruments, calibration, fixed stations, mobile surveys, institutional assessments, participant research, secure data systems, statistical analysis, independent auditing, and public reporting.

Costs would be established from the final number of cities, sites, instruments, participants, and specialized high-resolution assessments. Procurement quotations and statistical power requirements would inform the detailed request.

13 First National Report and Public Deliverables

- National monitoring protocol and training materials.
- Documented frequency coverage and measurement limitations.
- Exposure profiles for participating cities and priority settings.
- Analysis of seasonal, spatial, and temporal variability.
- Specialized findings on modulation-related microvariations where measured.
- Results of the initial health and psychophysiological evaluation.
- Review of locations requiring further monitoring or investigation.
- De-identified datasets and reproducible methods, subject to privacy protections.
- Recommendations for continued monitoring, research, and proportionate exposure management.

Public reporting would distinguish measurements from modeled estimates and identify uncertainty and missing data. Identifiable health information, precise participant locations, and sensitive facility information would be protected.

14 Requested Government Action

EFEIA Foundation respectfully requests that the United States Government convene relevant public-health, environmental, communications, energy, and measurement-science expertise; fund six months of preparation, twelve months of monitoring and evaluation, and six months of analysis and independent review; support university and municipal participation; and receive the first national report within two years.

Agency leadership and responsibilities would be established through the appropriate governmental process. This proposal does not imply existing agency endorsement.

Closing Statement

The National Monitoring Plan would establish an independent, coordinated assessment of electromagnetic exposure across United States cities, spanning ELF and LF fields through HF, broader RF, and high-GHz microwave frequencies. The initial two-year program would deliver a first national report grounded in documented measurements, transparent methods, and independently reviewed research.

References

[1] EFEIA Foundation. Projects. https://efeia.org/projects/

[2] Electronic Code of Federal Regulations. 47 CFR § 1.1310 Radiofrequency radiation exposure limits. https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-1/subpart-I/section-1.1310

[3] ICNIRP. Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields 1 Hz to 100 kHz. 2010. https://www.icnirp.org/cms/upload/publications/ICNIRPLFgdl.pdf

[4] World Health Organization. Radiation Electromagnetic fields. https://www.who.int/news-room/questions-and-answers/item/radiation-electromagnetic-fields