

ENA PROTOCOL FOR MEASUREMENT OF RESIDENTIAL ELECTRIC AND MAGNETIC FIELDS

This protocol for the measurement of residential electric and magnetic fields (EMF) within Australia was developed to assist the electricity supply industry and the public in the management of the EMF issue. The EMF Technical Advisory Committee of the Electricity Supply Association of Australia (later the Energy Supply Association of Australia) approved the protocol in December 1994 and it was subsequently issued to all electricity supply businesses. It replaced different, although similar in many respects, measurement protocols that have been used by electric utilities around Australia. When the responsibility for the EMF issue was transferred to the Energy Networks Association (ENA) in 2006, this protocol was also transferred. The protocol is reviewed periodically to ensure relevance and is currently in use within the industry.

The use of a common residential EMF measurement protocol by Australian utilities:

- ensures a consistent approach is maintained with all customers;
- enables better comparison of results between utilities; and
- facilitates the establishment of a common data base for further studies.

The emphasis in the protocol is on magnetic field measurements, but electric field measurements may be recorded in a “notes” section.

The protocol consists of:

- a structured component that specifies measurements at certain indoor and outdoor locations; and
- an unstructured educational component where measurements are made in various locations of interest to the resident.

The structured component provides a uniform method for obtaining spot measurements of the magnetic fields in specified locations and recording them. The unstructured component is to demonstrate various magnetic field sources including household appliances. Customers are invited to participate in the taking of readings and to request additional readings if required.

In 2002 the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) published Technical Report No 134 entitled “Measurement of Residential Power Frequency Magnetic Fields” by Ken Karipidis, March 2002. This is based generally on the present industry protocol and provides more detail on some issues. Users may also refer to this protocol which is available on the ARPANSA web site www.arpansa.gov.au.

A copy of the ENA measurement protocol follows. Inquiries should be directed to Richard Hoy, EMF Consultant to ENA on Tel 1800 076105 or Bruce Howard of TransGrid on Tel 02 9284 3074 who coordinated the preparation of the protocol.

Kevin Nuttall
Chairman
ENA EMF Committee

RESIDENTIAL EMF MEASUREMENT PROTOCOL

1. PURPOSE

To provide a common residential electric and magnetic field (EMF) measurement protocol for use by ENA members.

2. OUTCOME

The provision of a common residential electric and magnetic field measurement protocol to:

- a) provide data and information to residential customers; and
- b) enable establishment of a nation-wide electricity supply industry electric and magnetic fields database.

3. BACKGROUND

Different procedures for the measurement of residential EMF have been developed by various organisations according to their particular needs. Although these procedures have been similar, a common protocol is considered beneficial to allow:

- a) data to be presented to customers in a consistent format; and
- b) data to be collected and stored in a consistent format to allow for meaningful comparisons between utilities.

The protocol consists of a structured component that specifies certain indoor and outdoor measurements and an unstructured educational component.

- The structured component provides a uniform method for obtaining spot measurements of the magnetic fields in specified locations.
- The unstructured component is to demonstrate various magnetic field sources including household appliances. Customers are welcome to participate in and to request additional measurements which can be recorded in a special “notes” section of the form.

The emphasis of the protocol is on magnetic field measurements. However, electric field data may be recorded in the “notes” section.

4. PROTOCOL

A measurement form for the recording of measured data is attached. It is suggested the form be used in triplicate for distribution to customer, utility file and a central database.

- Recording of outline of house and including any electrical facilities within 50 metres, the meter box, service drop and water meter.

Structured component

- Measure set locations inside and outside of house for both low and high power conditions.

The lower power condition, simulating a time of low power use, is obtained by turning off most items, except clocks and refrigerators.

The high power condition, simulating a time of high power use, is obtained by turning on most lights and other appliances. The purpose of measuring under these two conditions is to compare the relative contribution of external and internal magnetic field sources within the home.

Unstructured component

- Measure magnetic fields produced by typical appliances as listed on the form.
- Carry out other measurements as requested by the customer.

5. EQUIPMENT

Basic equipment would consist of:

- three-axis magnetic field meter;
- one metre height meter stand;
- distance measurement device;
- measurement form; and
- customer relations brochures.

Optional:

- camera; and
- laptop computer.

All meters should be periodically calibrated as per ANSI-IEEE standard #644-1987. Attention should be paid to calibration at low field levels (<0.5 mG) due to influence of ambient magnetic field. In addition a calibration check, using a portable calibration coil, should be carried out before every measurement session.

All measurements (unless otherwise noted) should be made at 1 metre above ground/floor level as per ANSI-IEEE standard #644-1987. Each measurement will consist of the recording of three orthogonal components of the magnetic field.

6. RESIDENTIAL MEASUREMENT ETIQUETTE

Interior measurement procedures are intrusive by nature. Carefully trained field staff and a well designed protocol can reduce the inconvenience to residents. Some work practices to consider include:

- provision of formal training on residential measurements for field staff;
- provision of identification for staff and insurance for staff and residents; and
- provision of appropriate customer relations material.

Measurements of 50Hz Magnetic Fields

Resident	
Name:	_____
Address:	_____

	Postcode _____
Phone:	_____
<input type="checkbox"/> Detached House <input type="checkbox"/> Flat/Apartment <input type="checkbox"/> Townhouse <input type="checkbox"/> Other _____	
Measurement Date:	_____
Measurement Time:	_____
Reference Number:	_____

Magnetic Field Meter	
Meter Model:	_____
Serial Number:	_____
<input type="checkbox"/> Single - Axis Meter (maximum recorded) <input type="checkbox"/> Three - Axis Meter (resultant recorded)	
Manufacturer:	_____
Field Representative:	_____
Department:	_____
Address:	_____

Phone:	_____
Fax:	_____

Magnetic Field Measurements
 Units are μ T mG

Location	Low Power Usage*	High Power Usage ^
Front Door		
Living/Family		
Kitchen		
Master Bedroom		
Bedroom 2		
Bedroom 3		
Water meter/Pipe (next to)		
Meterbox (at meter reading position)		
Street Distribution Line/Cable		
Centre Front Yard		
Centre Back Yard		

Appliance/Other	Magnetic field on front surface of Appliance	At user position	
		Mag Field	Distance (cm)
Television			
Electric Heater			
Electric Kettle			
Electric Range			
Microwave Oven			
Clock-Radio			
Hair Dryer			
Other:			

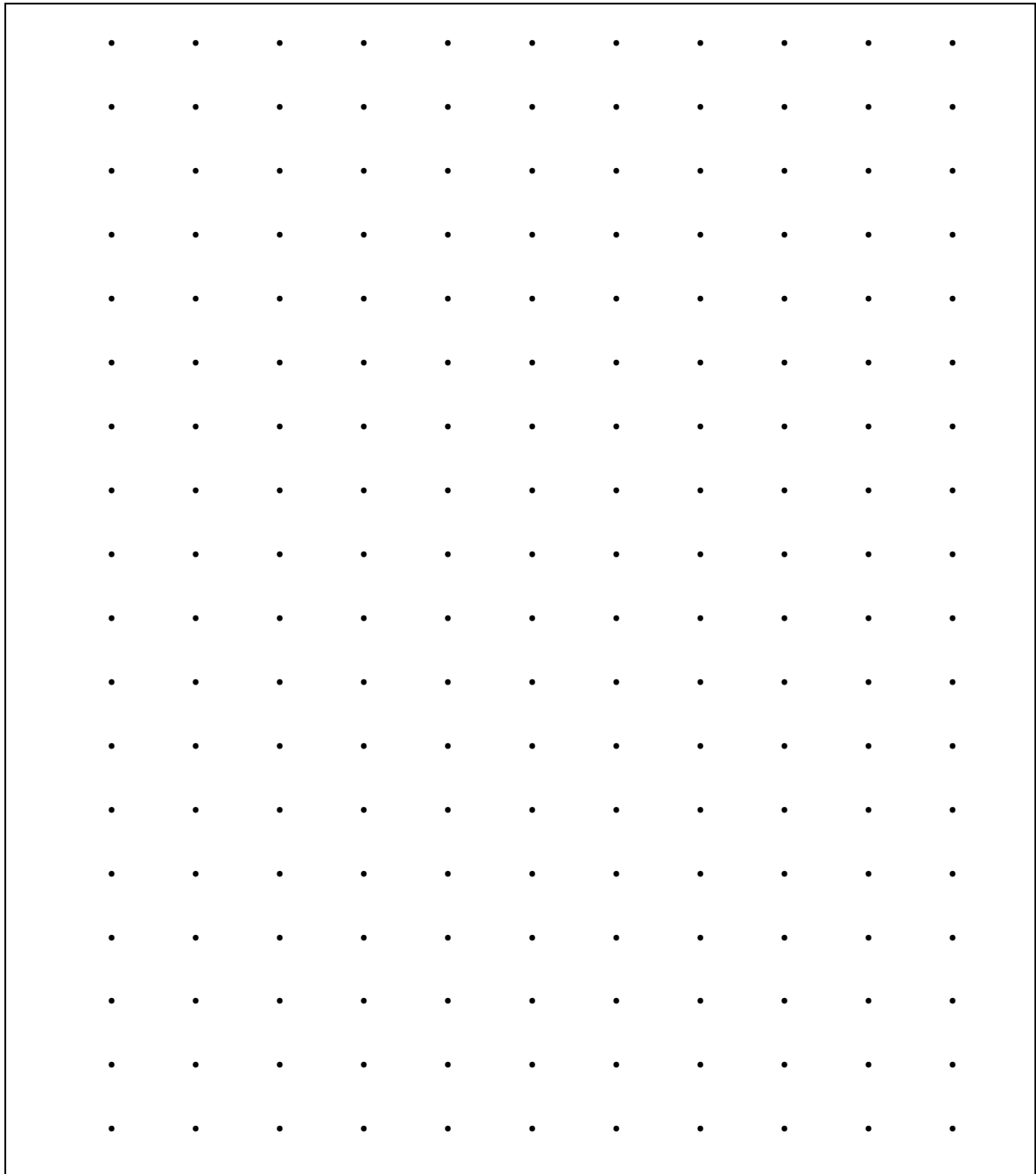
Notes: (eg additional measurements)

*Low Power Usage = Most items turned off (except clocks and refrigerator/freezer)
 ^High Power usage = Lights and a number of kitchen/entertainment/heating items turned on
 All measurements are 1m above floor/ground level. Room measurements taken at or near centre of room
 1 microTesla (μ T) = 10 milliGauss (mG)

Measurements of 50Hz Magnetic Fields

Reference No: _____

Sketch of House and Power Lines (50m Radius – Plan View)



Note: Indicate distances to electrical facilities
Indicate locations of Meter Box, Service Drop & Water Meter.