



Australian Government

Australian Radiation Protection and Nuclear Safety Agency

Assessment of Exposure to Power Frequency Magnetic Fields in the ABC TV Building at Toowong, Brisbane

February 2007

1. Introduction

ARPANSA was engaged by Professor Bruce Armstrong from the Independent Review and Scientific Investigation Panel of Breast Cancer in the ABC Toowong Queensland to perform a pilot study aimed at assessing exposure to power frequency (50 Hz) magnetic fields in the ABC TV building at Toowong, Brisbane, Queensland. The assessment was part of an investigation into causes of an apparent increase in the incidence of breast cancer cases among the ABC staff over the past decade. The pilot study included spot measurements in most accessible areas of the relevant buildings and four-hour personal exposure assessment of three volunteer members of staff to determine the practicality of using the EMDEX II instruments for this purpose.

2. Method

The assessment of power frequency magnetic fields was carried out on 18 December 2006 by Mr Ken Karipidis from ARPANSA.

Instrument

- a. Model – EMDEX II (EnerTech Consultants, Campbell CA)
- b. Frequency response – 40 to 800 Hz
- c. Sampling rate – Variable but for the purposes of this project the maximum rate which is 1.5 sec.
- d. Units - Magnetic flux density in units of milligauss (mG)
- e. Uncertainty – Instrument calibration factors at 50 Hz within 5%

Spot measurements

Spot measurements were carried out on the ground and first floors of the TV building by doing a walk-through survey of the majority of areas accessible to staff between 11:17 am and 1:10 pm (Floor plans of the TV building ground and first floors are shown on Appendix 1). During the walk-through the EMDEX meter logged the magnetic field every 1.5 seconds and recordings, in particular work areas (such as desks, studios, equipment rooms etc) at torso height locations of staff, were noted (photographs of selected work areas are shown in Appendix 2).

Personal monitoring

Personal monitoring was carried out to ascertain the magnetic field exposure of three staff members (one each from the ground and first floor of the TV building and one from the radio building) for 4 hours (from 11am till 3pm). The three volunteers were provided by the ABC and ARPANSA neither selected the individuals nor sought to influence their work patterns. It is unknown how representative their work patterns were of the women suffering health effects.

For personal monitoring the EMDEX meters were placed in fabric “bum-bags” which were worn by the subjects. The bum-bags were worn by the subjects around the waist at the front of the body at all times for the duration of the survey.

3. Results

Spot measurements

The spot measurements and summary statistics of the walk-through survey are shown on Fig. 1. The mean magnetic field level was 0.87 mG (the median was 0.41 mG). The highest reading of 21.1 mG was recorded in the Equipment Room which is located in the ground floor of the TV building. None of the other spikes in Fig. 1 were notable work areas and may have resulted from walking past/near high current sources. The maximum readings in specific work areas are shown in Table 1.

Fig. 1 Spot measurements and summary statistics of the walk-through survey of the ground and first floors of the TV Building

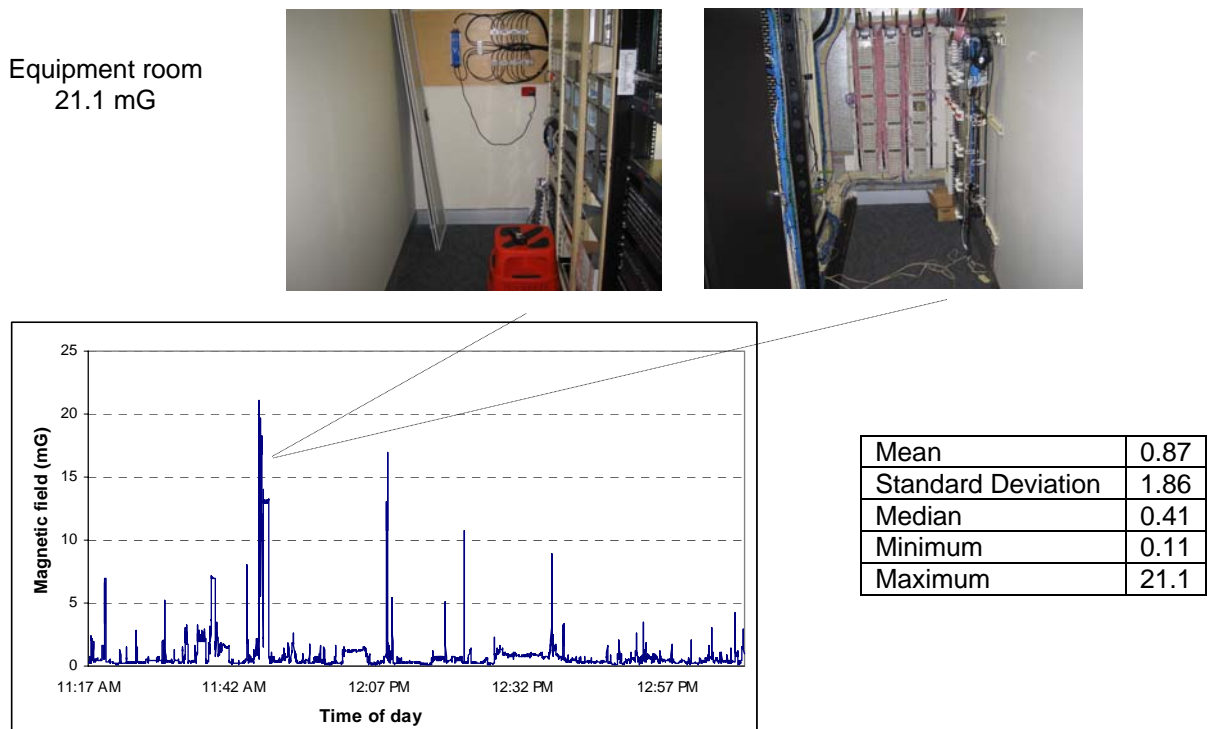
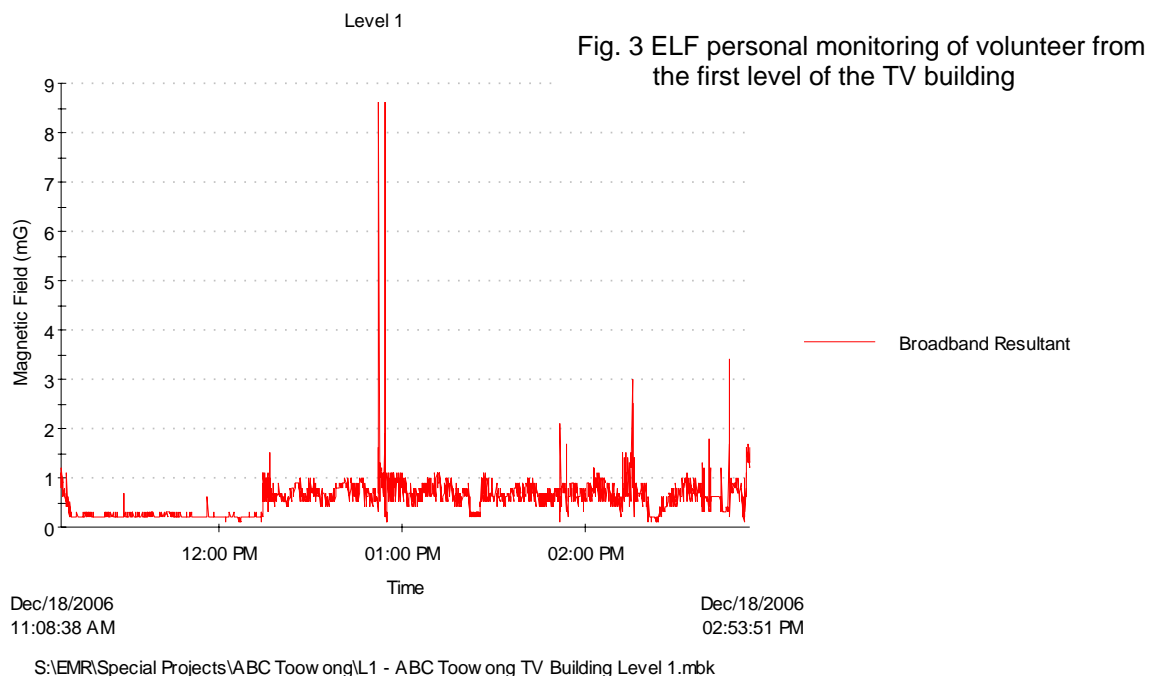
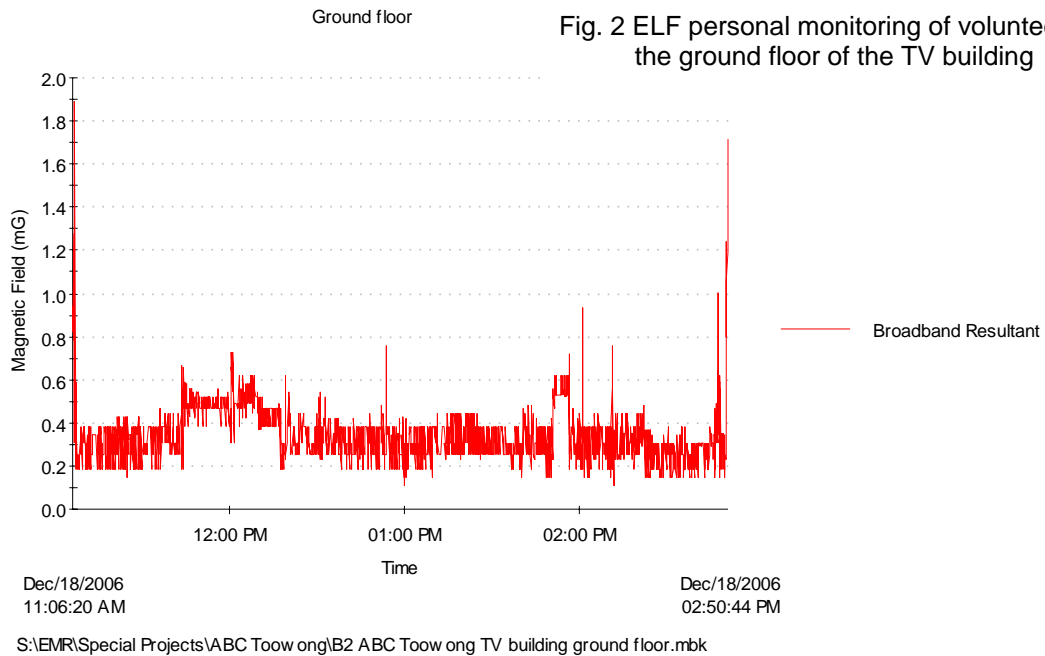


Table 1 Maximum magnetic field levels in particular work areas

Location (ground floor)	Magnetic Field (mG)	Location (first floor)	Magnetic Field (mG)
General office	1.2	General office	1.7
Rest area	0.3	Office 1	0.4
Studio 1	1.8	Reception	0.3
Studio 2	0.5	Production support	0.6
Studio 3	1.3	Meeting room	0.6
Audio booth	1.5	Kitchen	2.5
News control	3.5	Staff area	0.4
News break	0.4	Broadband intake	1.1
Equipment room	21.1	Newspaper bench	0.3
Edit booth 1	0.7	Studio	0.3
Edit booth 2	0.8	Technical production	0.8
Edit booth 1	0.7	Backyard	0.6

Personal monitoring

The personal exposure measurements and summary statistics for the three volunteers (one each from the ground and first floor of the TV building and one from the radio building) are shown on Figs 2-4 and Table 2. The time-weighted average exposures were 0.34 and 0.56 mG for the volunteers from the ground and first floor of the TV building respectively and 2.03 mG for the volunteer from the radio building (note different vertical scale on each figure).



Radio building

Fig. 4 ELF personal monitoring of volunteer from the radio building

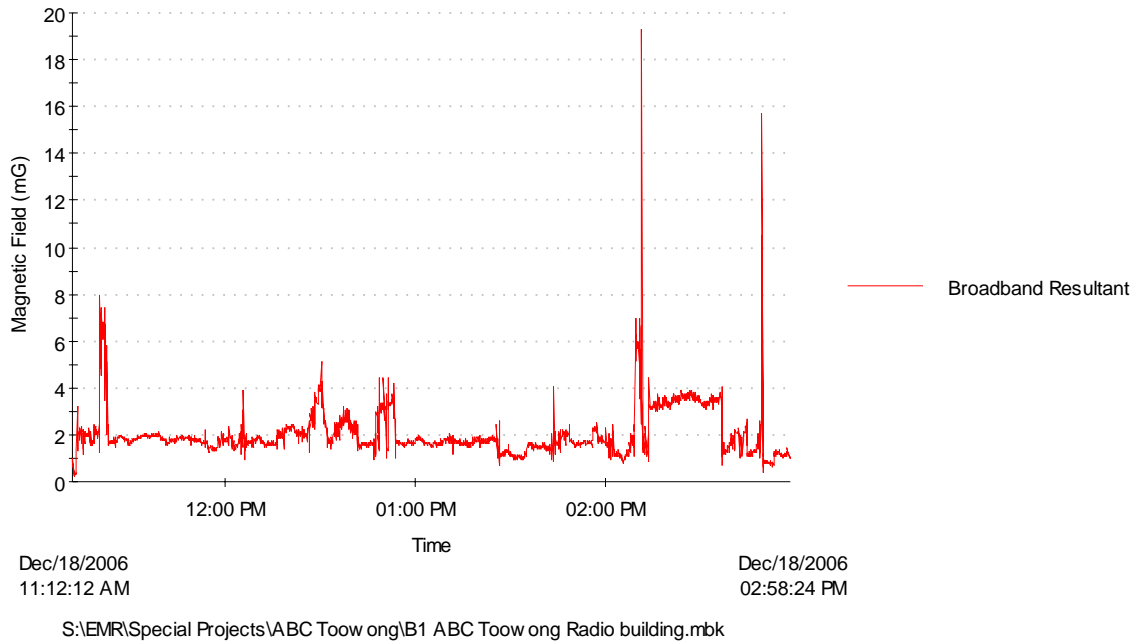


Table 1 Personal monitoring summary statistics

	TV Bld ground floor (mG)	TV Bld level 1 (mG)	Radio Bld (mG)
Mean	0.34	0.56	2.03
Standard Deviation	0.11	0.33	1.00
Median	0.31	0.61	1.76
Minimum	0.11	0.11	0.23
Maximum	1.89	8.61	19.30

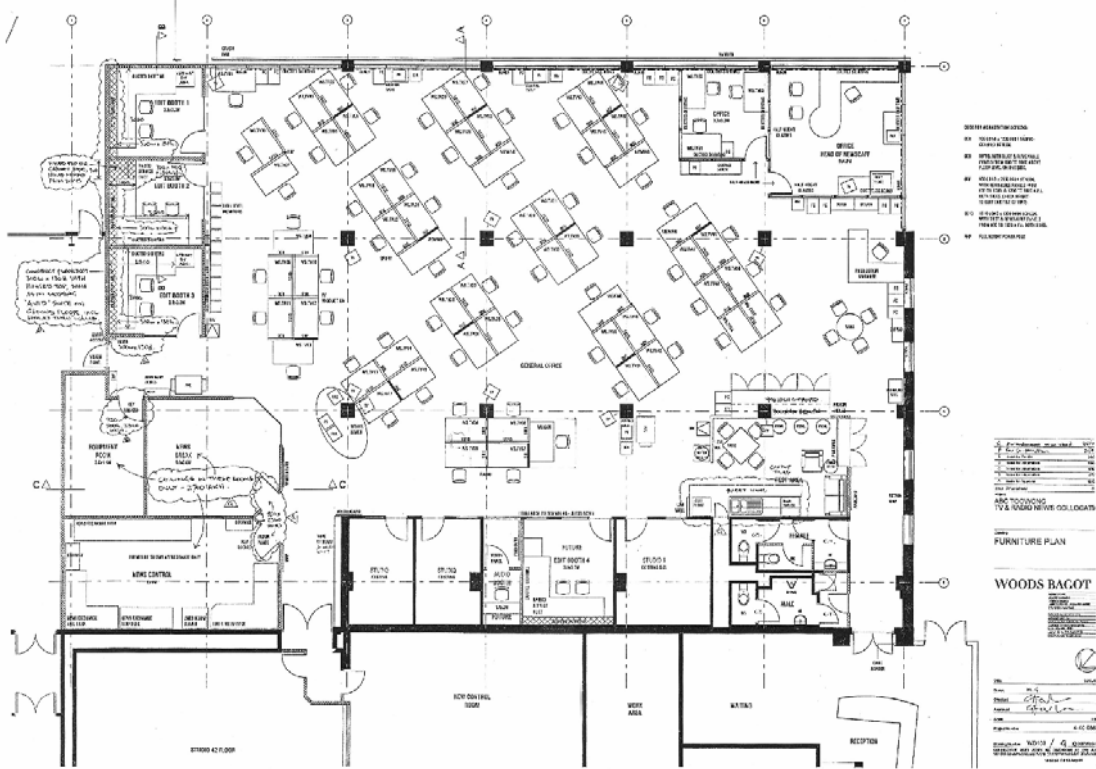
4. Summary

Although many of the workstations in the TV building had several pieces of audiovisual equipment, exposure to power frequency magnetic fields was much lower than what is usually encountered in a normal office environment. The spot measurements were generally low with a mean magnetic field level of 0.87 mG. There was one room (the Equipment room on the ground floor of the TV building) where the exposure reached 21.1 mG. The personal monitoring showed similar levels for the volunteers from the ground (TWA=0.34mG) and first (TWA=0.56mG) floors of the TV building which were lower than the volunteer from the radio building (TWA=2.03mG).

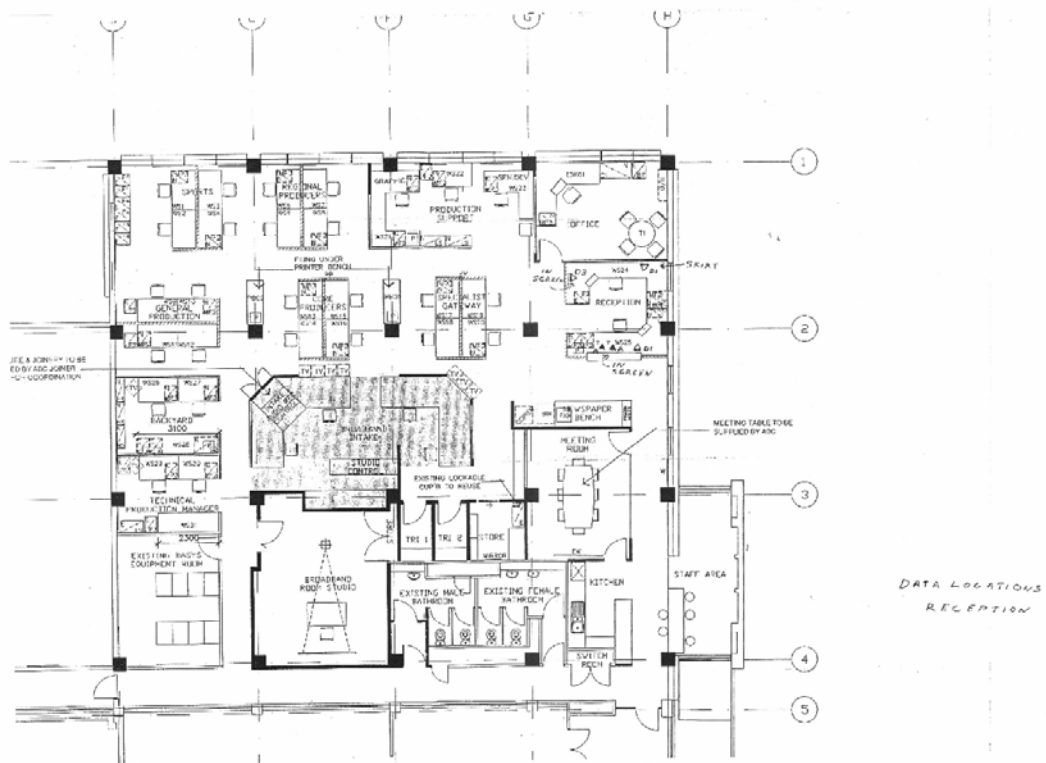
Ken Karipidis
7 February 2007

APPENDIX 1 Floor plans of the ground (a) and first (b) floors of the TV building

(a)



(b)



APPENDIX 2 Photographs of selected work areas in the TV building



Audio booth (Ground floor)



News control (Ground floor)



Broadband intake (first floor)



General office (first floor)



General office (ground floor)



Edit booth 1 (ground floor)